2008

A Science & Mathematics Magnet School at Maymont

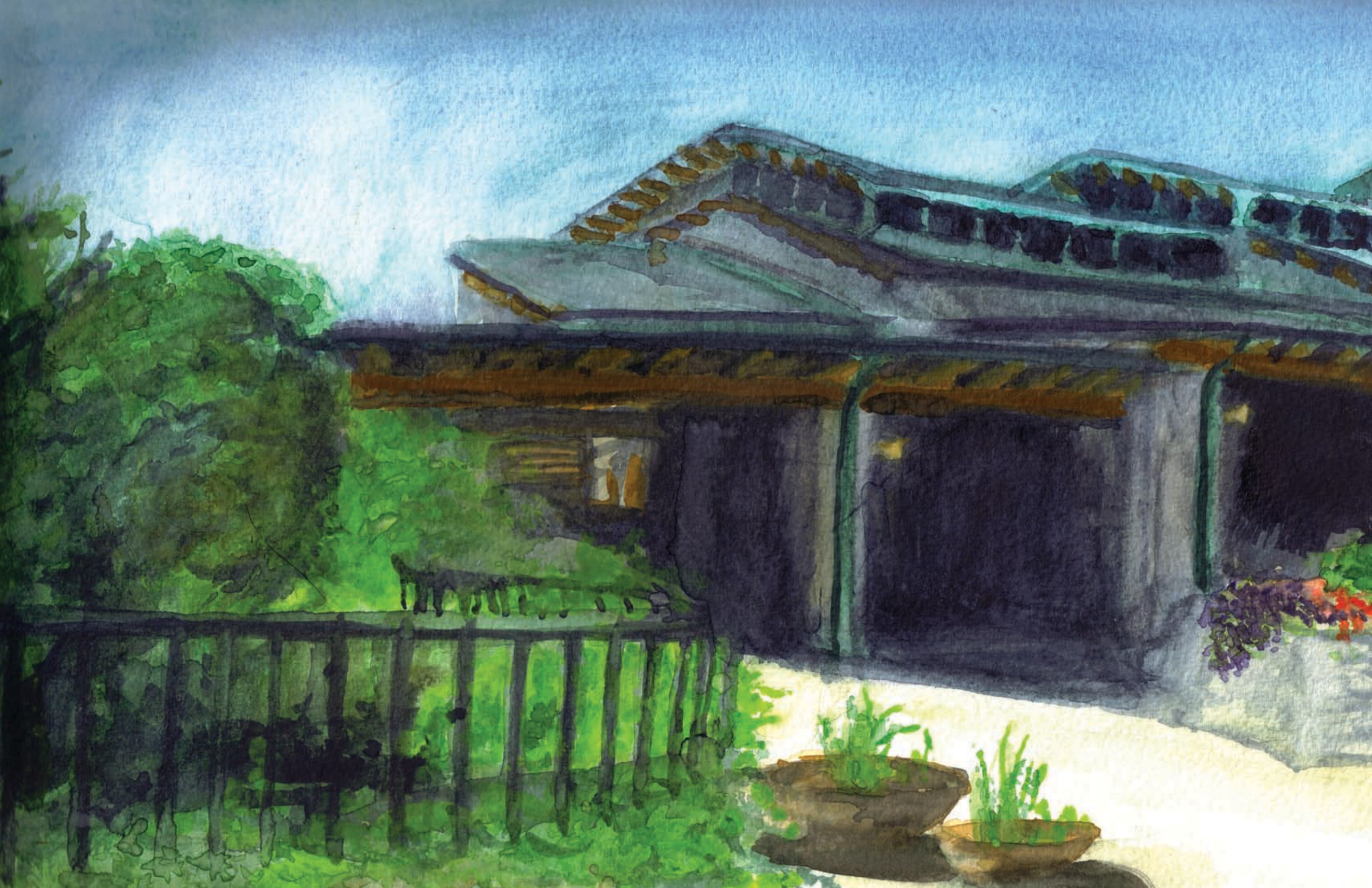
Sarah Shamus Nakfoor
Virginia Commonwealth University

A SCIENCE & MATHEMATICS MAGNET SCHOOL AT MAYMONT

SARAH NAKFOOR

INTERIOR DESIGN GRADUATE THESIS

MAY 2008



DESIGN MANIFESTO

I search for connections.
With and among objects and people.
Exploring similarities and adjacencies.
Determining differences and boundaries.
Considering how they shape and influence one another.
Deciphering the theory of grand unification.
How everything is interconnected.
This theory supports the means and identifies the reasons.
It gives a foundation; a starting point.
Discovering that is imperative in understanding and designing.

Sarah Nakfoor
May 2008

ABSTRACT

I am interested in the idea that schools should be designed to offer individualized learning."A Science & Mathematics Magnet School at Maymont" explores a type of school that is becoming more familiar and accessible. By allowing students who have an interest in excelling in school and preparing for their future careers to come together and meet one another and experience an education that might not otherwise be available can be beneficial in many ways. In most cases, because of the funding required for such specialized schools, class sizes are reduced to meet budgets and the schools are opened to the community to gain funding. Smaller class sizes increase student interaction and aid in forming connections among students and between students and teachers. The use of the school as a venue for the community adds needed revenue. Both occurances may be advantageous and positively effect community at the school and surrounding populous levels.

TABLE OF CONTENTS

Robin's Nature & Visitor Center

Location: Maymont Park, Richmond, Virginia

Building Type: Nature/Visitor Center

Year Built: 1999

Square Footage: 20,000 sq. ft.

Architect: Bond Comet Westmoreland & Hiner Architects

Construction: W.M. Jordan Company, Inc.

Post-Occupancy: Maymont Foundation – Robin's Visitor & Nature Center

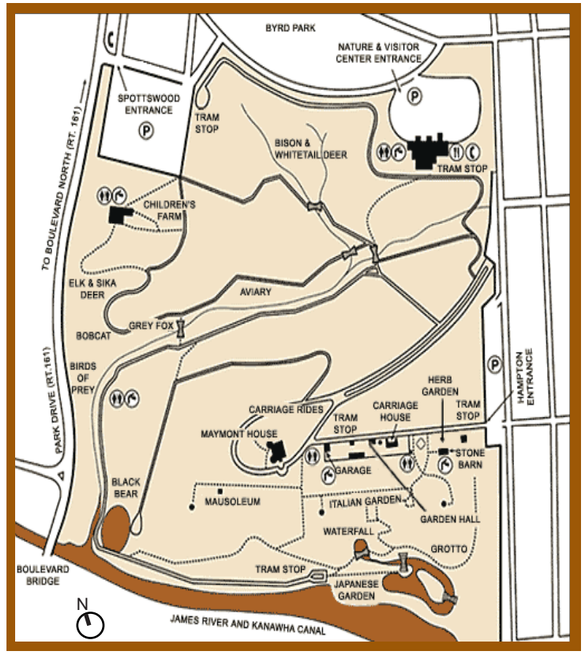
About:

Now home to the Maymont Foundation, Maymont Park encompasses the full 100-acres of a grand Victorian country estate once belonging to James and Sallie Dooley. In 1886, the Dooleys first viewed and purchased the rough pasture and field that would become Maymont Park. Sallie Dooley led the effort to transform the landscape into a showplace that would rival the lavish estates that were springing up throughout the country. Major Dooley died in 1922, and upon Mrs. Dooley's death in 1925, Maymont was bequeathed to the City of Richmond. There were no heirs to remodel the residence and its interiors. There were no subsequent generations to parcel the land or to sell off the Dooleys' distinctly personal collection of decorative arts. In fact, only six months after Mrs. Dooley's death, Maymont opened as a public park and museum, and has survived intact. Today it is an unusually complete example of a Gilded Age estate. The estate, now known as Maymont Park, including the residence, gardens, grounds and original architectural complex, remains very much as it was during the Dooleys' time. Surrounding the Robin's Nature & Visitor Center, Maymont Park is host to walking trails which lead to the Maymont estate, an Italian garden, a Japanese garden, various wildlife habitat enclosures, and the children's farm.

The Robin's Nature & Visitor Center, located on a sloping elevation in the field setting of Maymont Park, serves as a site for introducing Maymont's history and natural surroundings. Visitors to the center enjoy self-guided tours through Maymont's nature exhibits and a variety of staff-led educational programs are offered throughout the year. The main exhibit hall features a 20 foot waterfall cascading into the first of 13 giant, linked aquariums that are home to playful river otters, turtles and fish of all shapes and sizes. Interactive galleries, including a replica of Richmond's floodwall, a weather station and a fish ladder, complete this memorable river experience. The Nature & Visitor Center displays murals and a large topographical map to help guests plan their day at Maymont Park. In addition to behind-the-scenes tours, night hikes and many other public programs, the Nature Center is visited annually by nearly 50,000 school children attending classes which reinforce Virginia's Standards of Learning. The Maymont Shop features everything from garden ornaments and jewelry to children's games and books. The Maymont Cafe offers light lunch options and indoor and outdoor seating with outstanding views of the grounds.

-Courtesy of maymont.org

Map of Maymont Park

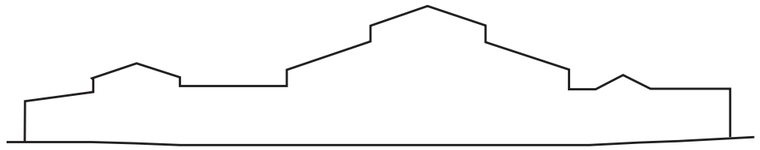


Aerial View of Nature Center

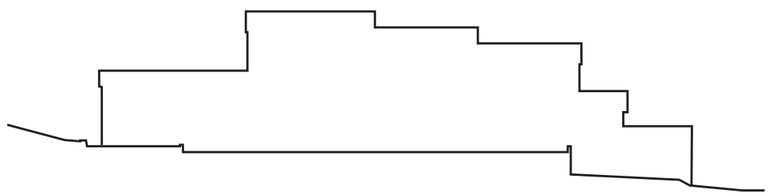
elevated slope maximizes view & is reflected in building plan

small parking lots minimize site's impact

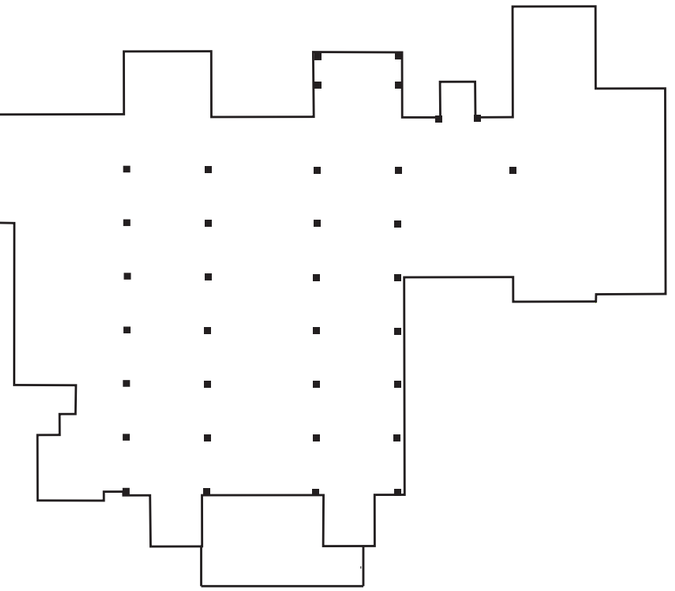
south facing outdoors increases natural light



North



West



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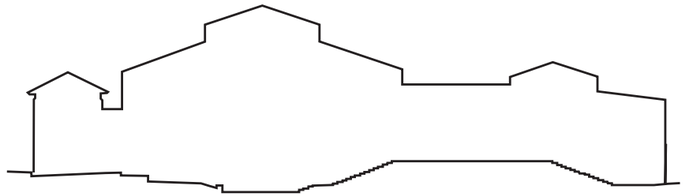
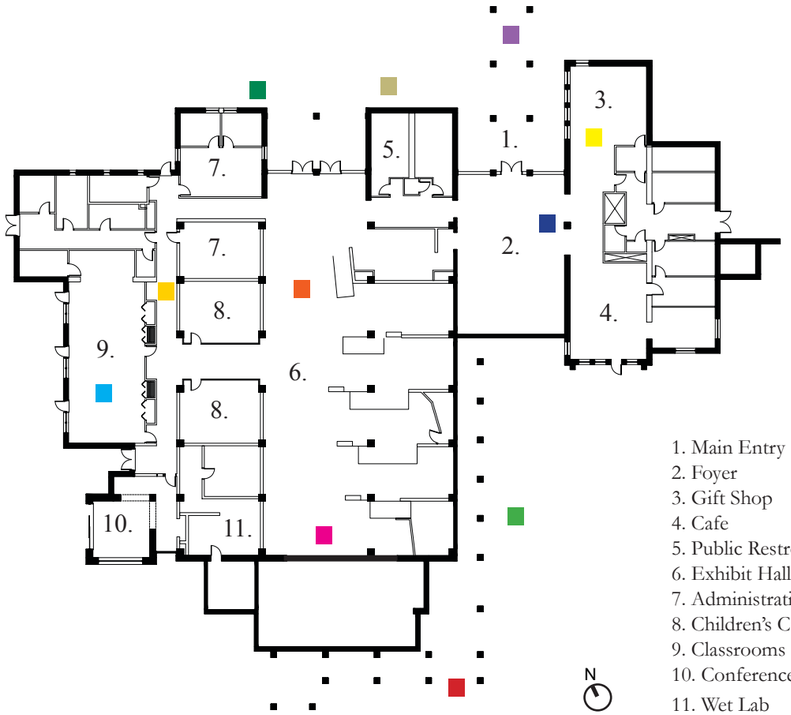


South



1. Main Entry
2. Foyer
3. Gift Shop
4. Cafe
5. Public Restrooms
6. Exhibit Hall
7. Administration
8. Children's Center
9. Classrooms
10. Conference Room
11. Wet Lab

A SCIENCE & MATHEMATICS MAGNET SCHOOL

PROGRAM

Science Exploration Center (SEC) educational guidelines:

Numerous public high schools from different districts within the county, considered “home base schools,” participate with SEC by sending their students for accelerated learning in math and science. The “home base” schools are varied: both urban and suburban. Students attending SEC come from diverse backgrounds and cultures but share the common goal of excelling in school and preparing early for their future careers. Compared to most public schools, SEC offers more educational choices and smaller class sizes. Students leave with a better understanding of their interests and needs, and gain a stable foundation upon entering college.

SEC’s students are high-achievers who are self-motivated and interested in exploring mathematics and science topics in order to experience hands-on learning with an investigative approach that isn’t always available in typical public schools. Students attend classes only in the afternoon, for 2 - 55 min. sessions, after instruction in the morning at their “home base” school. Like most magnet schools, SEC is highly competitive; a limited number of students are accepted and the level of interest always outweighs the school’s capacity. To ensure fairness, SEC’s students are selected by a yearly lottery.

SEC provides numerous opportunities for students who have an interest in excelling in the math and science disciplines while taking advanced placement and college-prep courses. The school offers state-of-the-art technology and laboratory equipment which is available for use student use after regular school hours. SEC takes advantage of Maymont’s natural setting; students often participate in fieldwork around the school, attend class in the outdoor educational space, and utilize the newly added greenhouse for projects.

SEC’s pedagogy focuses on individual student needs while also encouraging student collaboration and involvement in the variety of disciplines studied at the school. The program enables students to interact with each other, to work together and to learn from one another. The library, student lounge (where students have lockable desks for personnal items) and the research and instrumentation lab are areas where students who might not be in the same classes may meet one another, discuss their studies, develop projects together and ultimately, form friendships.

SEC acts to connect with the local populous by being a venue for the community. Examples of community uses include: after-hours classes, lectures and social events in the library which utilize the new pull-out stage, a proctored testing site, and a field trip destination for younger students. While also generating revenue for the school, SEC is a center for social and cultural activities.

Courses offered:

Chemistry

Biology

Environmental Science

Botany

Mathematics

School Capacity:
80 students

Class Size:
16 students

“School is a part of its community.
Not apart from it.”

- C. William Brubaker,
Planning and Designing Schools

“Schools are opening their doors for longer hours and welcoming segments of the population who typically did not venture into school buildings.”

- Buchler & Johnson,
Becoming a Learning Community

CONCEPT

Main Concepts

A learning environment that fosters collaboration and community through students' discovery of similar interests and the application of a crossover of math and science disciplines.

SEC's classrooms and laboratories are combined to form "suites." Comprised of instructional and hands-on learning areas, the suites offer a functional and adaptable environment that maximizes the building's physical space and increases efficiency during the teaching and learning process.

Concept Model

Displays connections made through the formation of a community.

Watercolor Studies

Watercolor studies displaying 3 main usage areas:

Administration • Teaching • Community

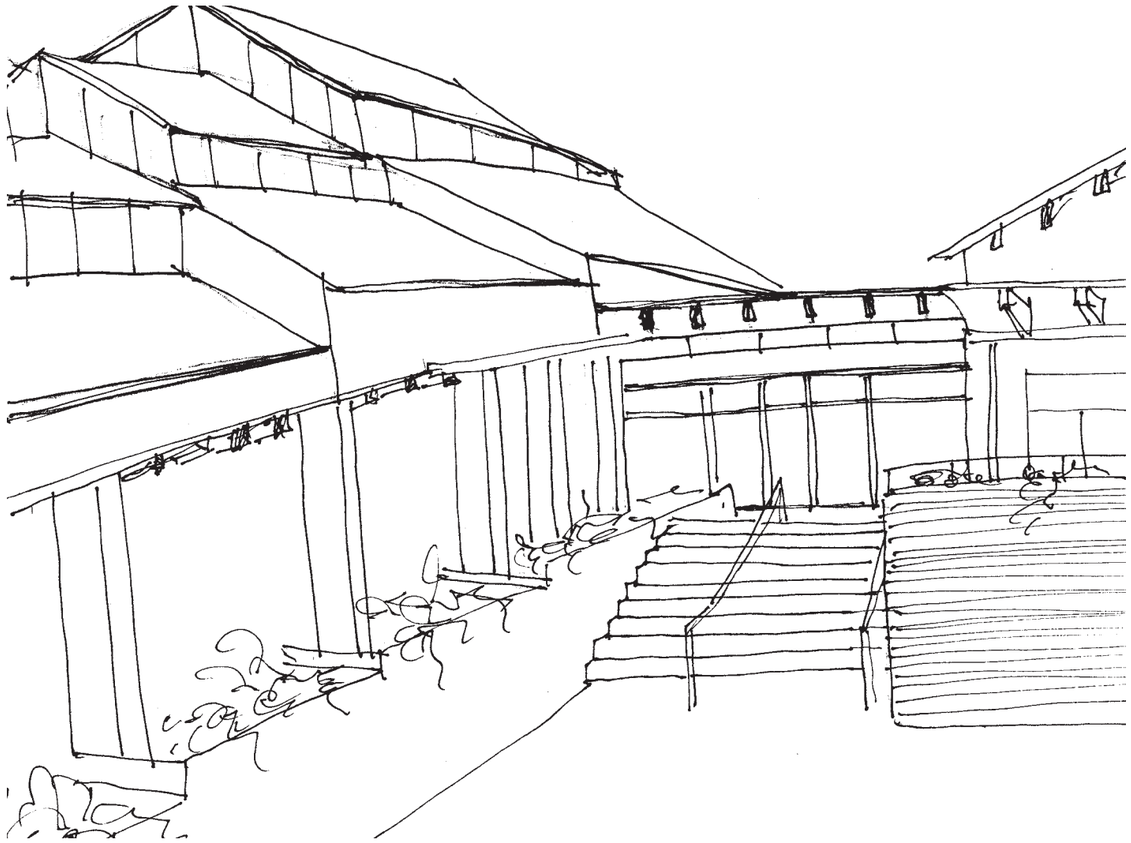
group spaces: highly saturated; individual spaces: less saturated

secondary colors display overlapping usage

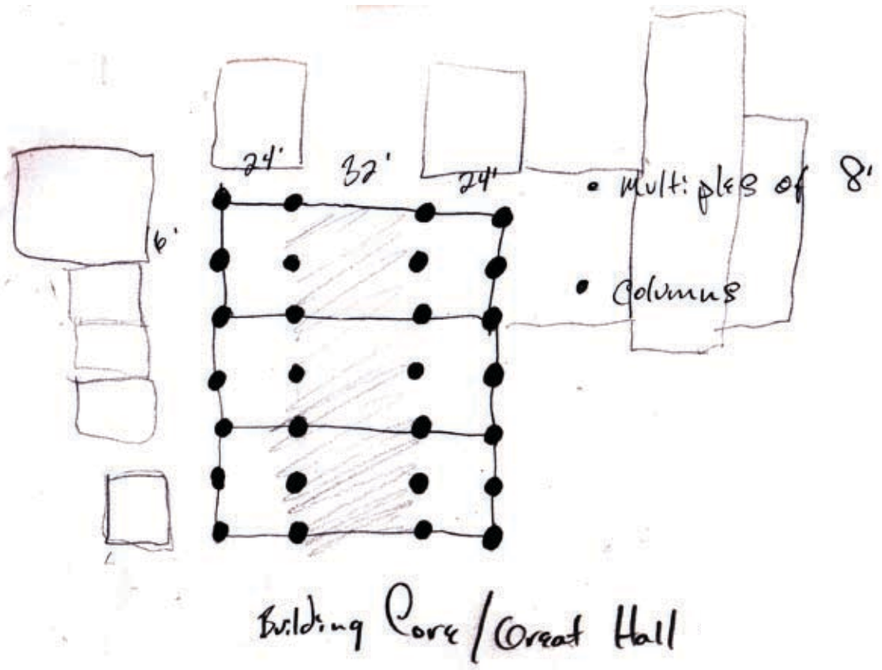
Conclusion:

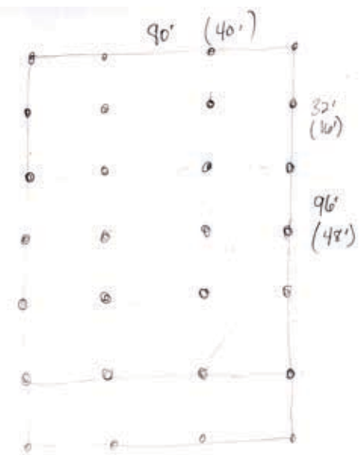
Group and community activities define the majority of SEC's program.

Quick Sketch: Maymont Nature Center's South Entrance

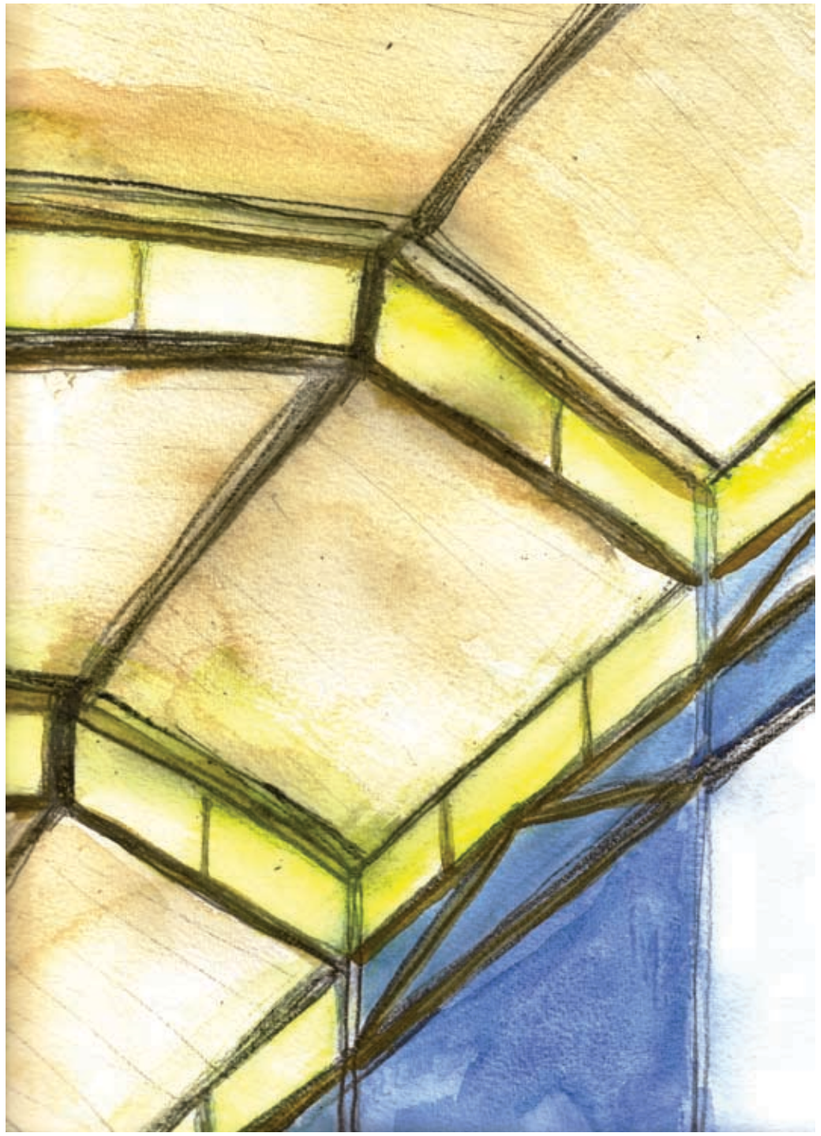


Column Grid Study

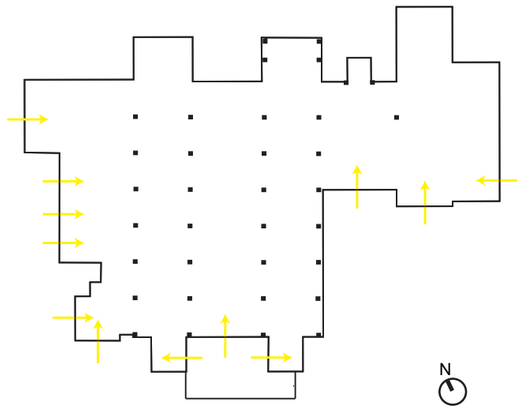


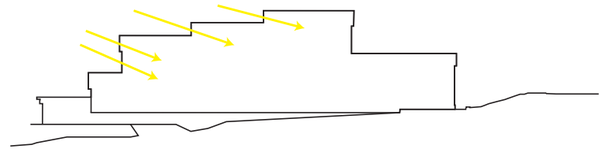


Watercolor & Charcoal Study: Exhibit Hall Ceiling Trusses & Clerestories



Light Studies





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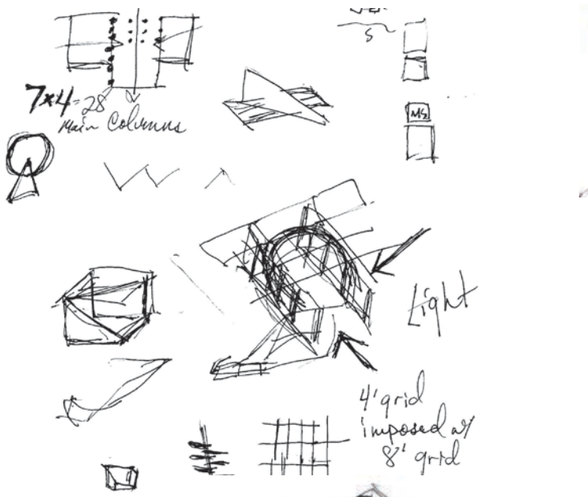
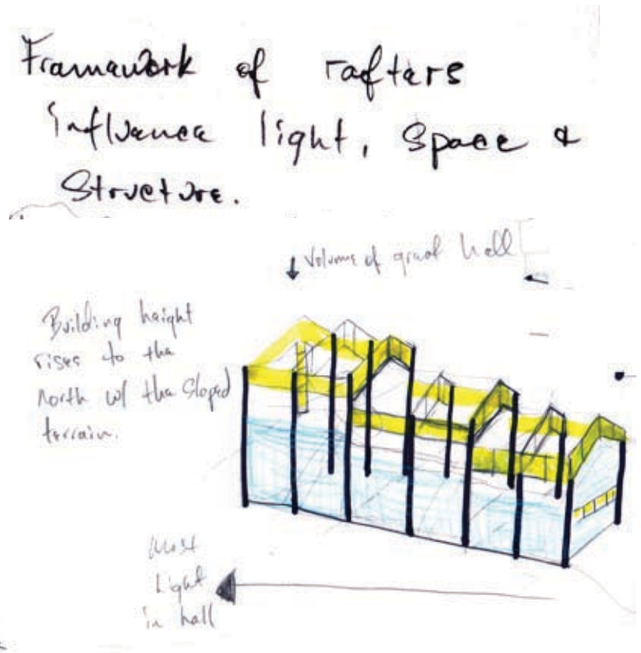
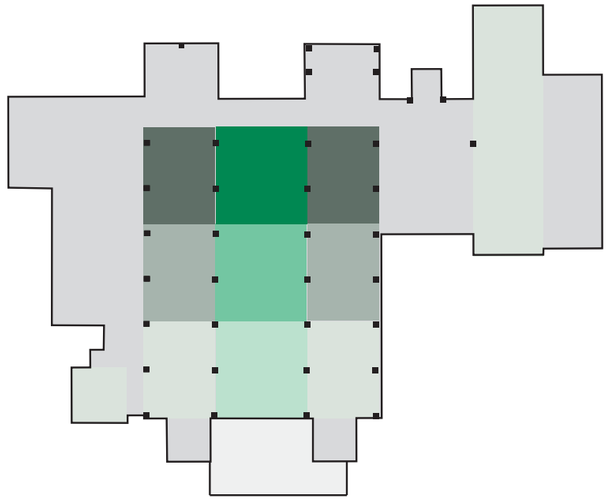
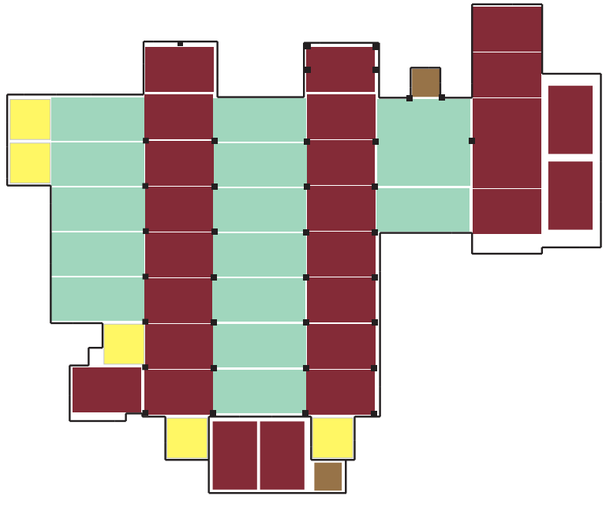




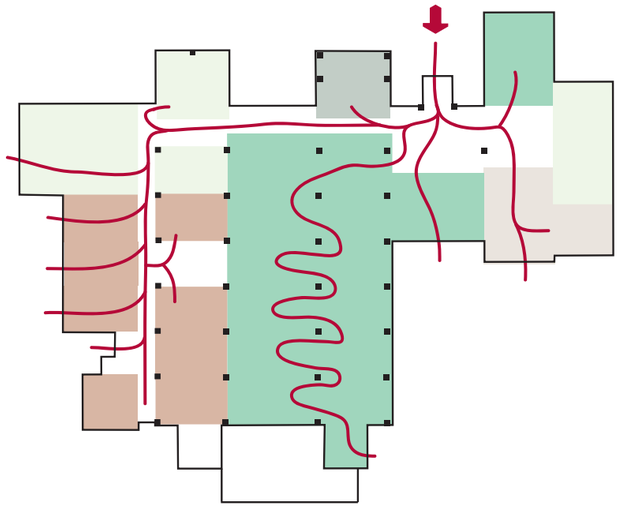
UNIT TO WHOLE - ROOF HEIGHT



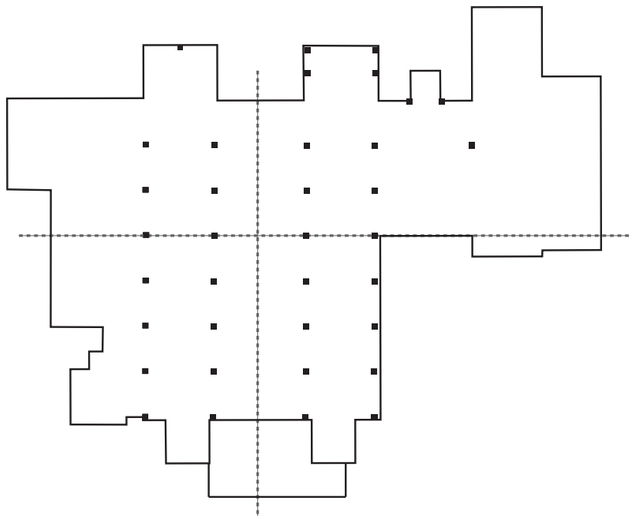
REPETITIVE TO UNIQUE



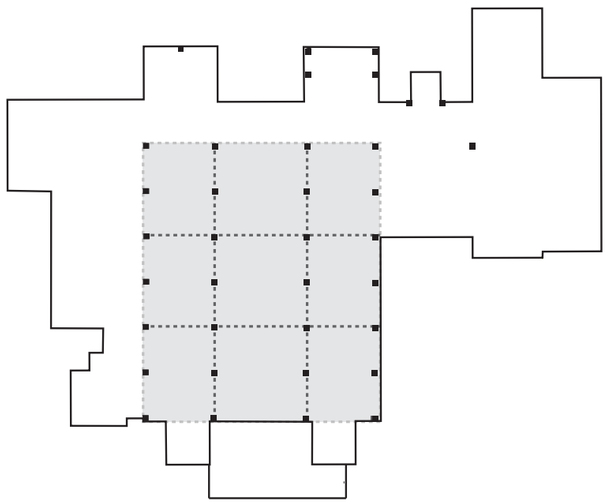
CIRCULATION



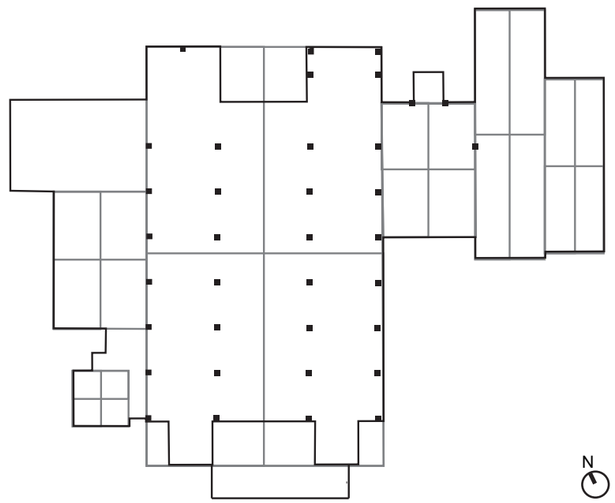
BALANCE



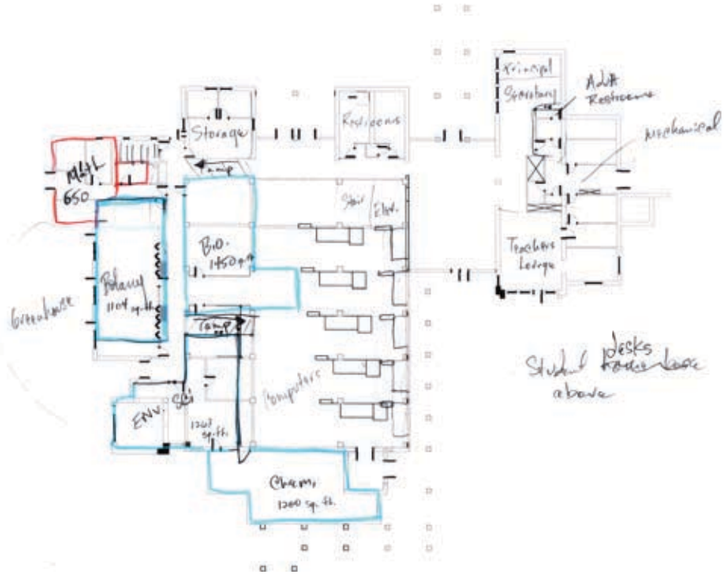
NINE - SQUARE

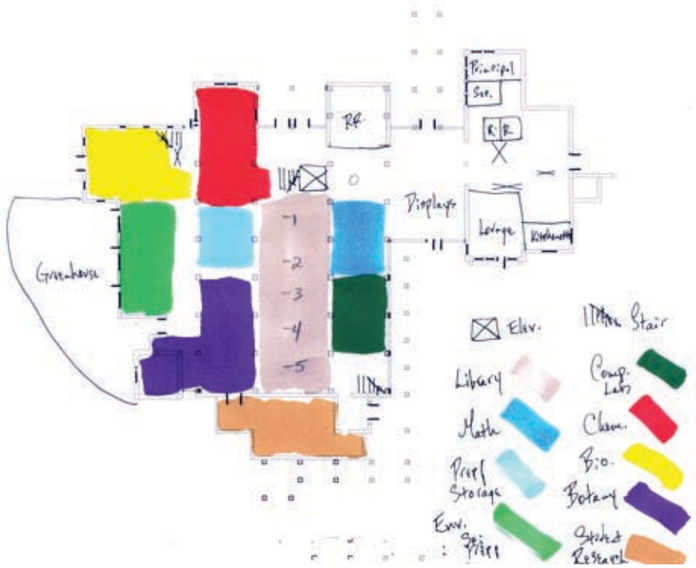


ONE TO ONE-HALF



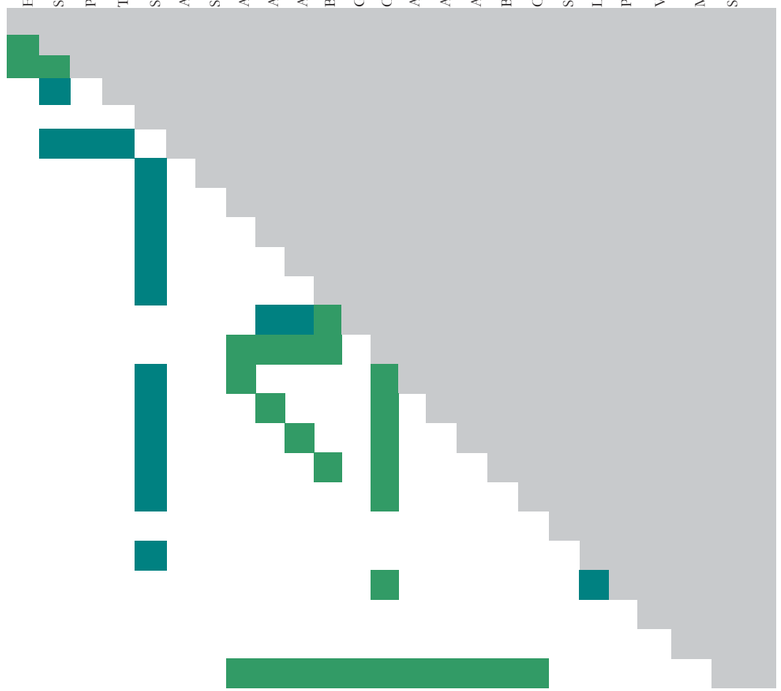
Block Plans





Adjacency Matrix

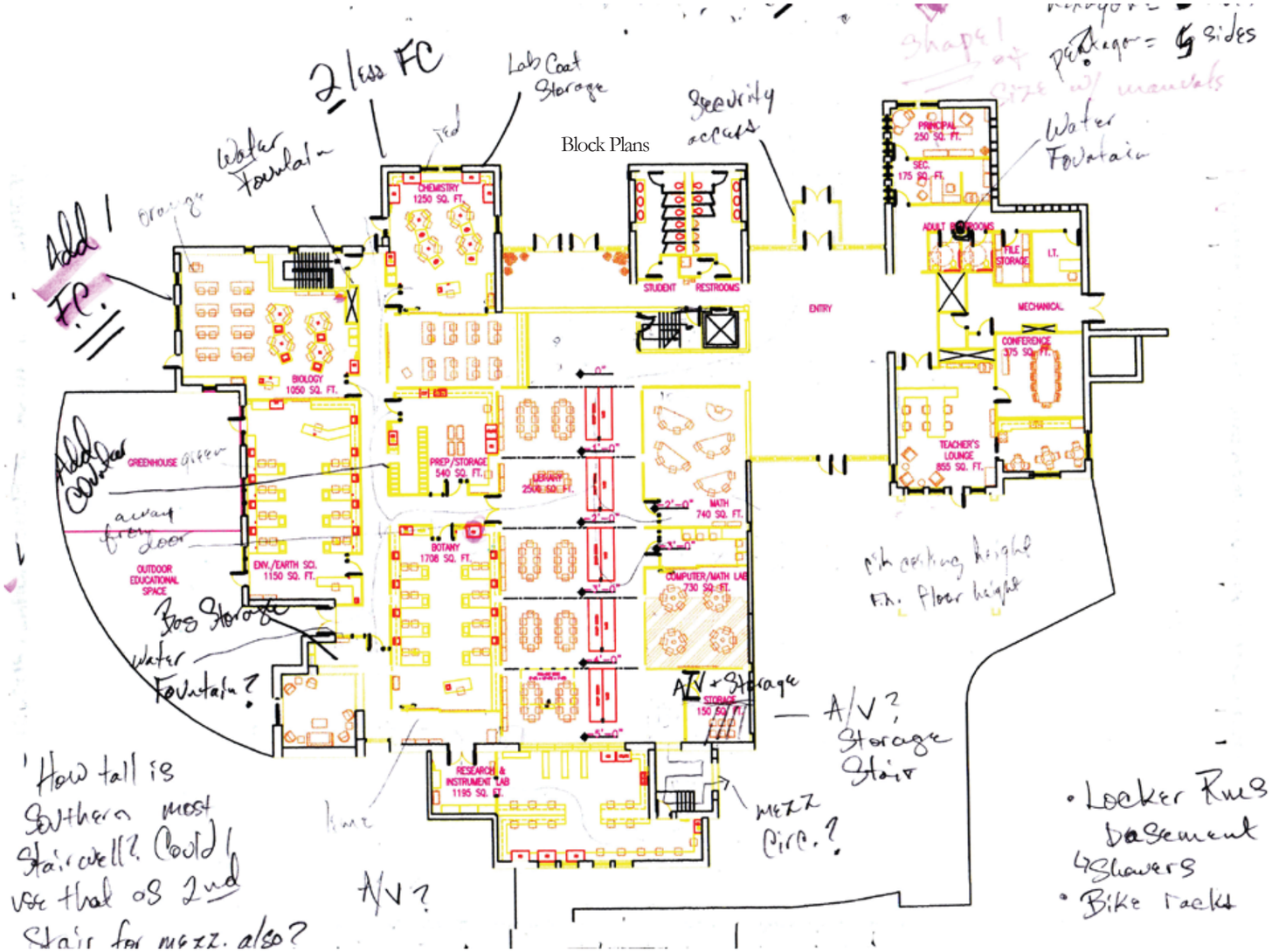
ENTRY
SECRETARY
PRINCIPAL
TEACHERS LOUNGE
STUDENT RESTROOMS
ADULT RESTROOMS
STUDENT HOME BASE
AP CHEMISTRY LAB
AP BIOLOGY LAB
AP ENV. SCI. LAB
BOTANY LAB
GREENHOUSE
COMPUTER LAB
AP CHEMISTRY CLASS/LECTURE RM
AP BIOLOGY CLASS/LECTURE RM
AP ENV. SCI. CLASS/LECTURE RM
BOTANY CLASS/LECTURE RM
MATH CLASS/LECTURE RM
STUDENT LOCKER RM.
LIBRARY
PRINTING/COPY CENTER
VENDING MACHINES
MECHANICAL
STORAGE



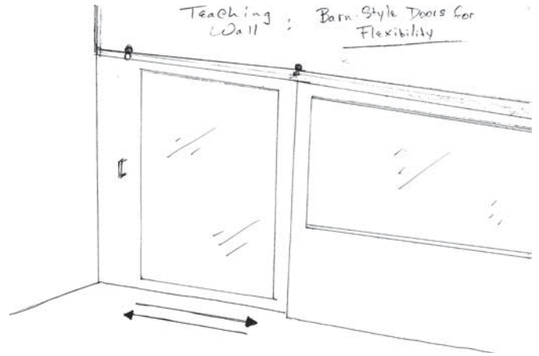
Direct/Primary Adjacency

Convenient/ Secondary Adjacency

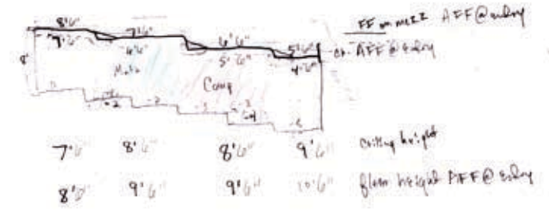
Revised Floor Plan

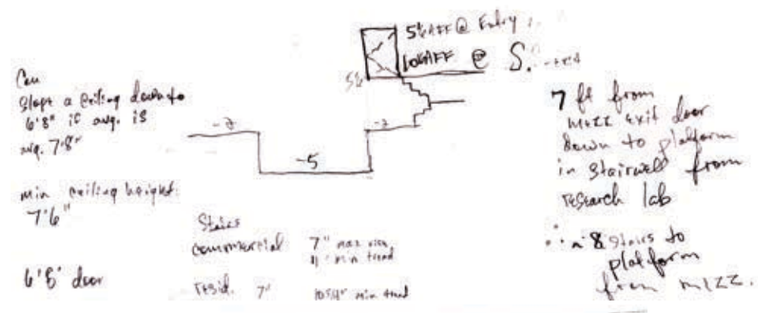


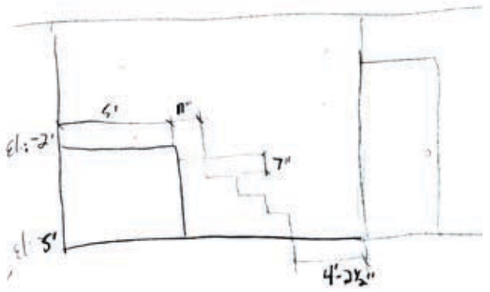
Teaching Wall Partition Sketch



Mezzanine & Stair Sketches

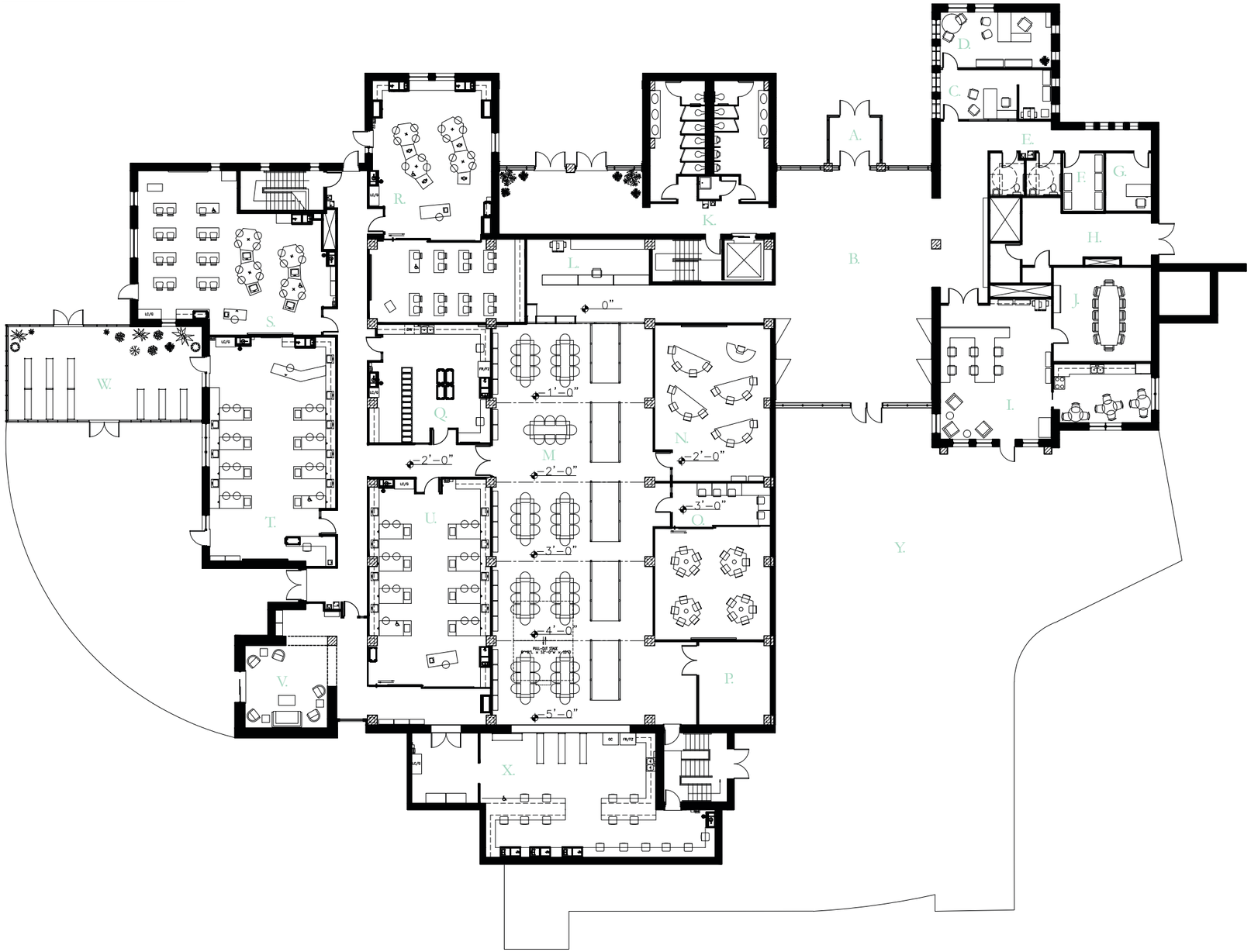




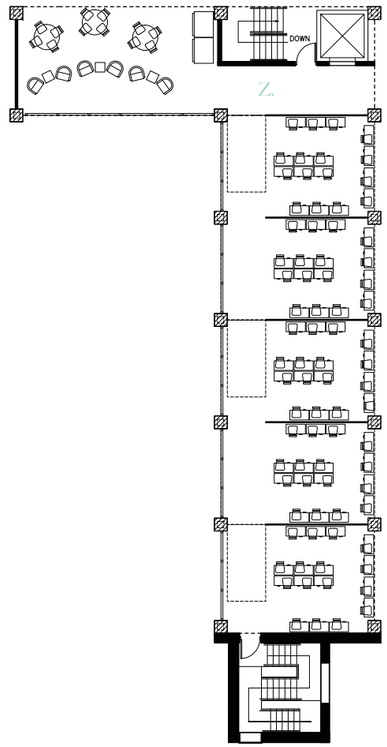


FLOOR PLAN

MAIN FLOOR



MEZZANINE

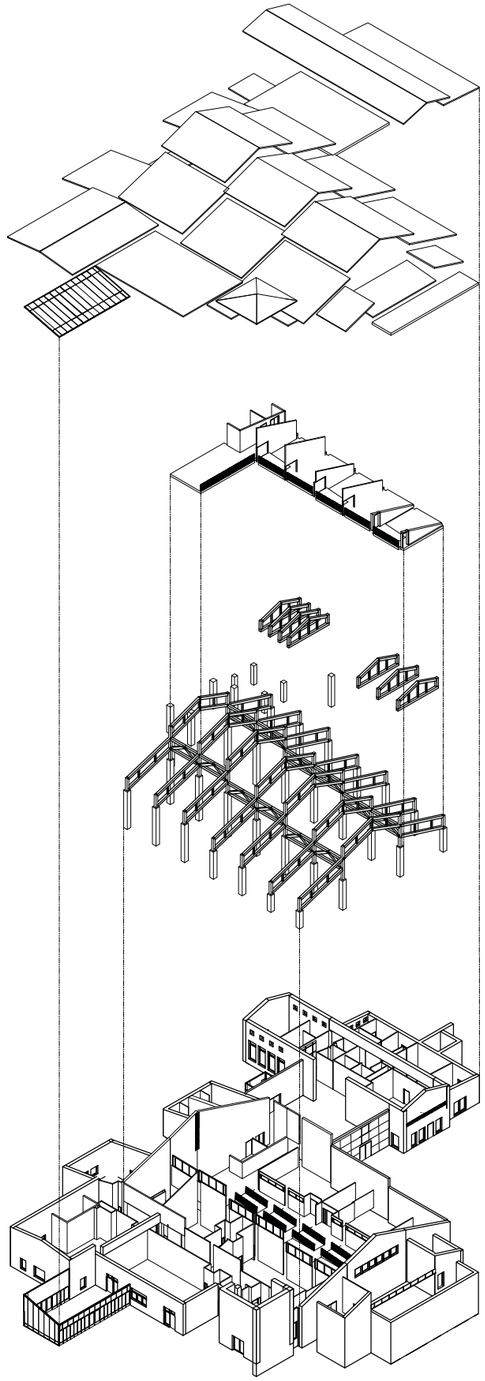


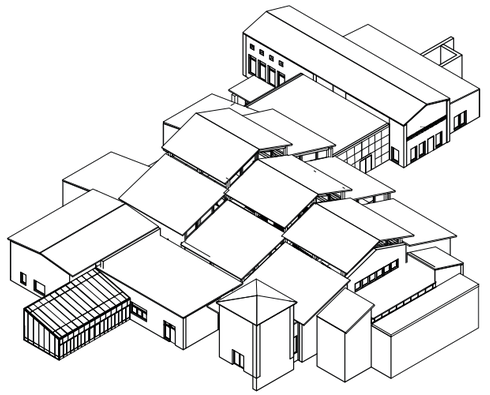
N

(drawings not to scale)

A. SECURE ENTRY B. FOYER & EXHIBITION SPACE C. SECRETARY D. PRINCIPAL E. ADULT RESTROOMS F. FILE STORAGE G. I/T H. MECHANICAL I. TEACHER'S LOUNGE J. CONFERENCE ROOM K. STUDENT RESTROOMS L. MEDIA DESK M. LIBRARY N. MATH CLASSROOM O. COMPUTER / MATH LAB P. A/V & UTILITY ROOM Q. PREP & STORAGE ROOM R. CHEMISTRY SUITE S. BIOLOGY SUITE T. ENVIRONMENTAL SCIENCE SUITE U. BOTANY SUITE V. BREAK-OUT AREA W. GREENHOUSE X. RESEARCH & INSTRUMENTATION LAB Y. TERRACE Z. STUDENT LOUNGE

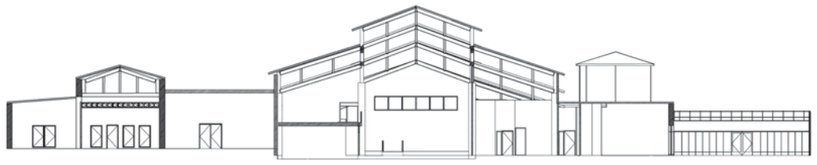
AXONOMETRIC PROJECTIONS



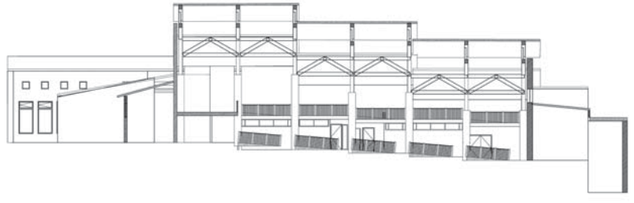


SECTIONS & ELEVATIONS

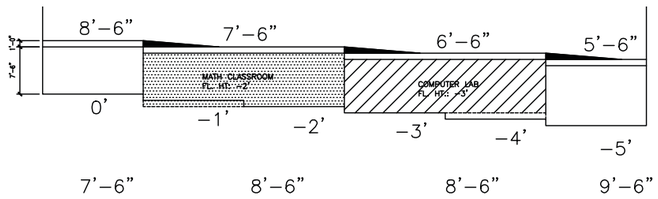
North to South



West to East



Mezzanine

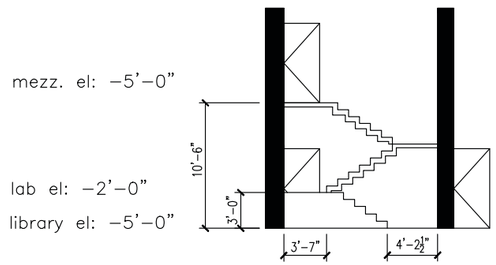


MEZZANINE FLOOR EL. FROM ENTRY FF.

MAIN FLOOR EL.

CEILING HT.

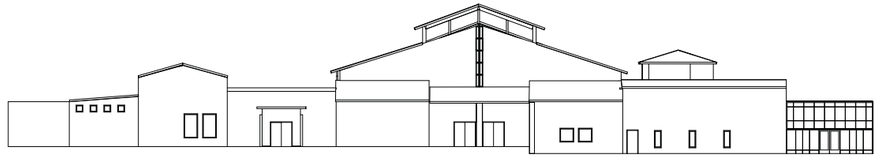
South Stair



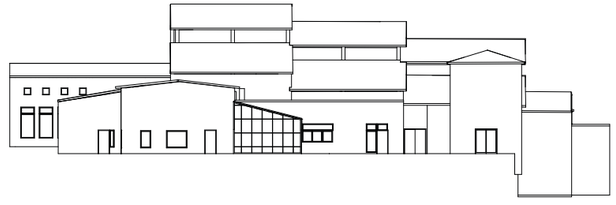
HEADROOM CLEARANCE = 80" min.

outside el: –5'–0"

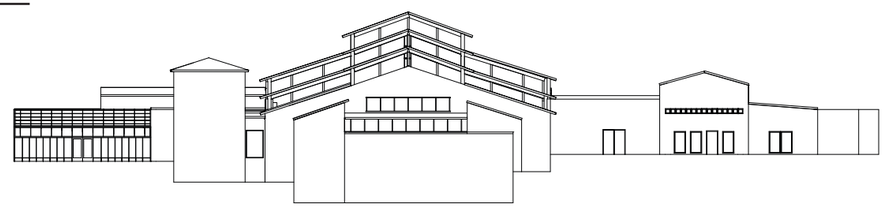
North



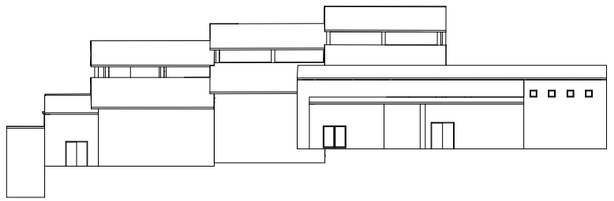
West



South



East

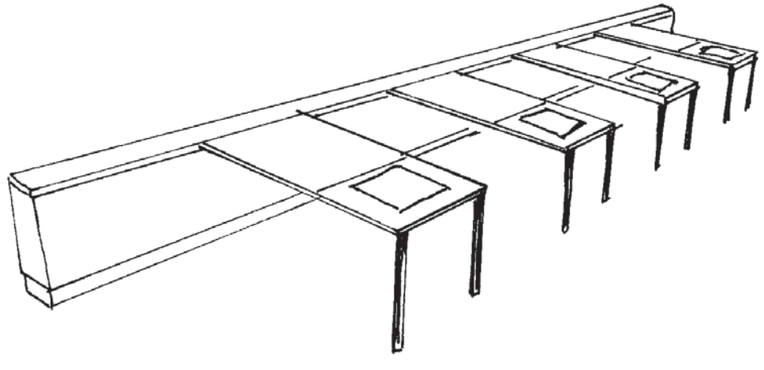


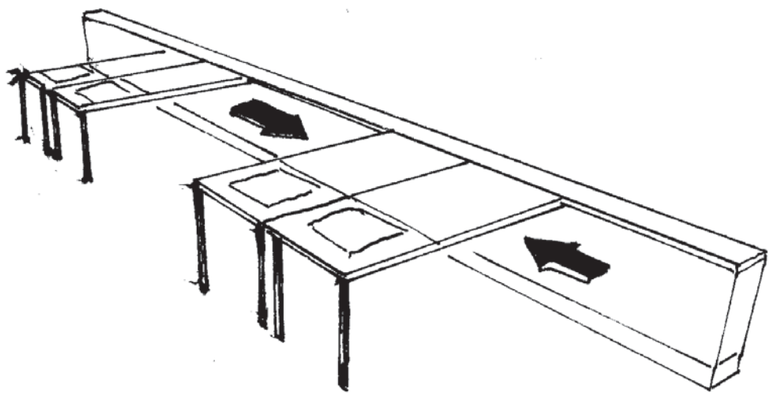
(drawings not to scale)

DESIGN DETAILS

Adjustable Perimeter Benches

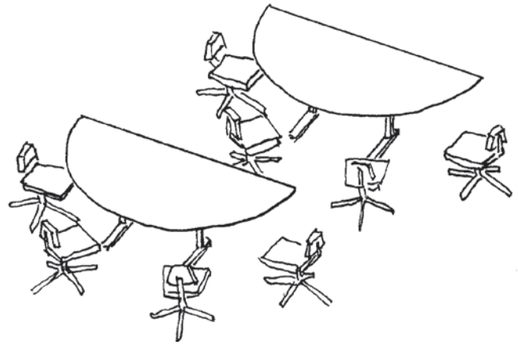
Used individually or in groups in Environmental Science and Botany Suites. Benches slide on rails to allow for larger groups of students and more work surface area.

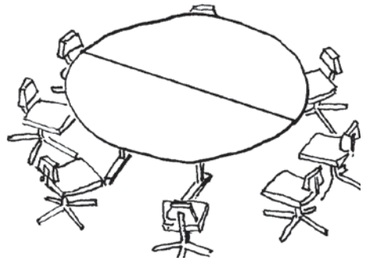




Half-Round Tables

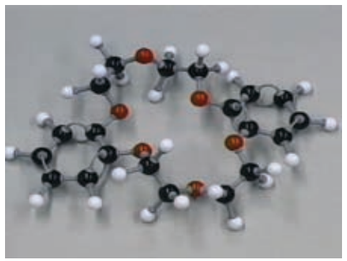
Used individually or in pairs in Math Classroom. Table shape encourages student interaction.





Molecular Model

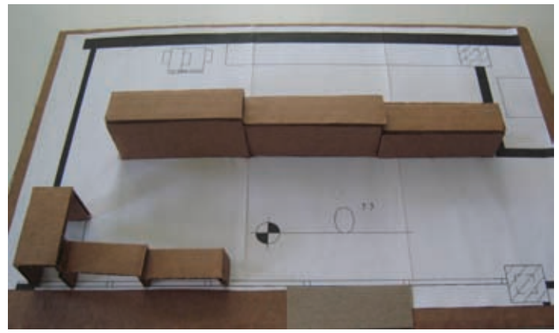
Inspiration for Chemistry Suite design. Portrayed in color palette, floor pattern and workstation shape and arrangement.



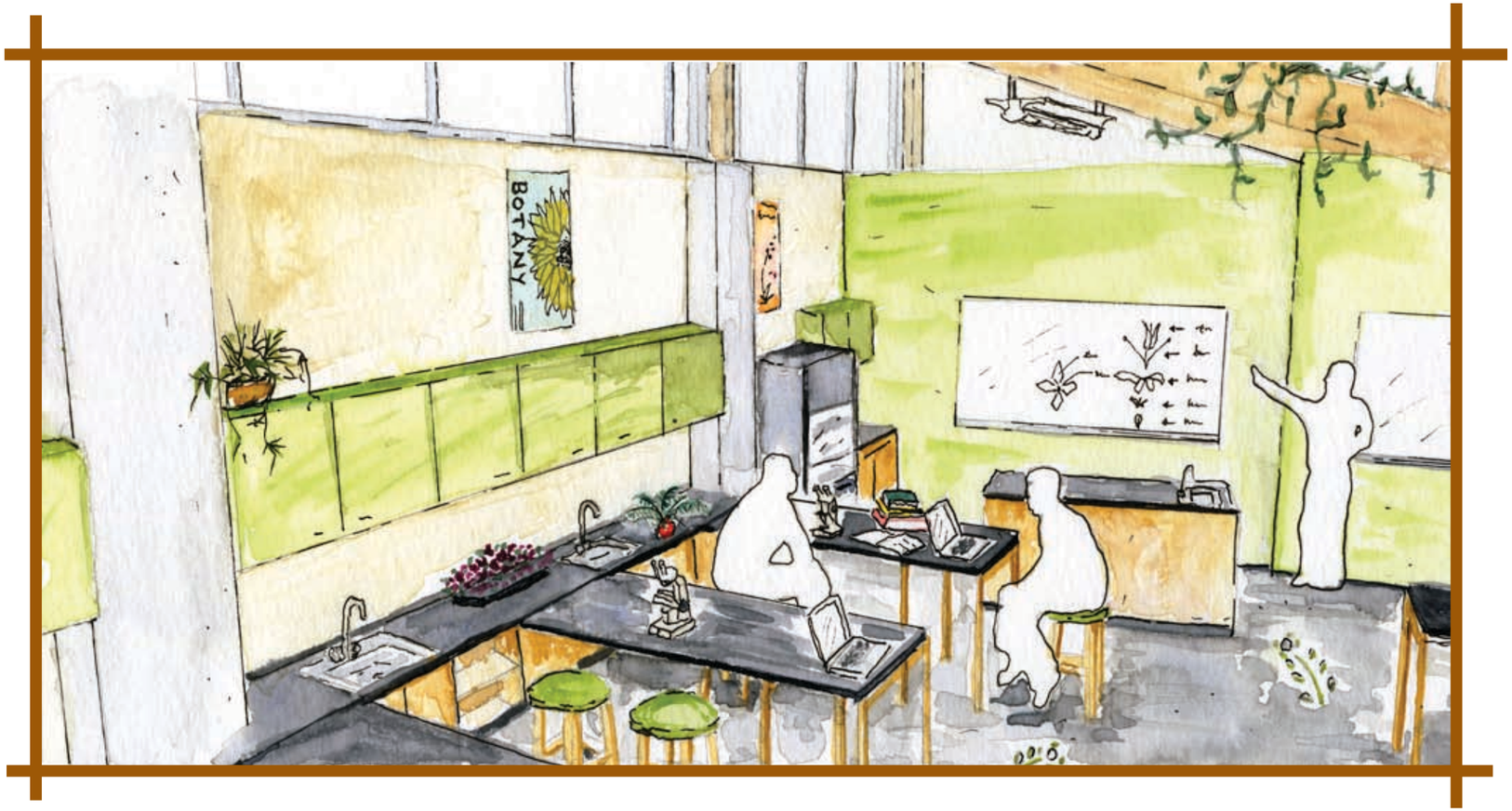
Chemistry Suite
Floor Pattern

Bench & Media Desk Model

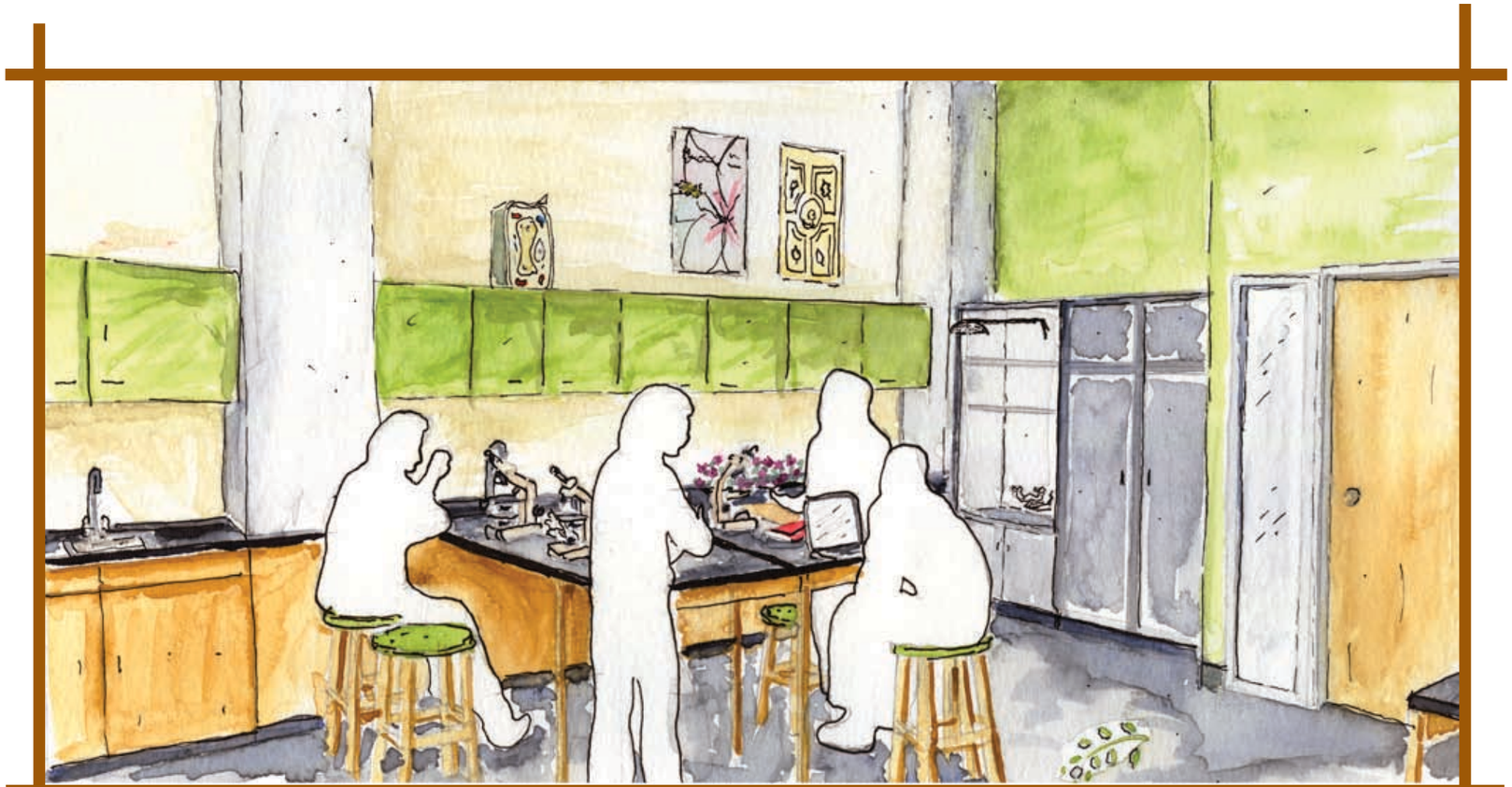
ADA Media Desk with small seating area provides a space for student interaction.

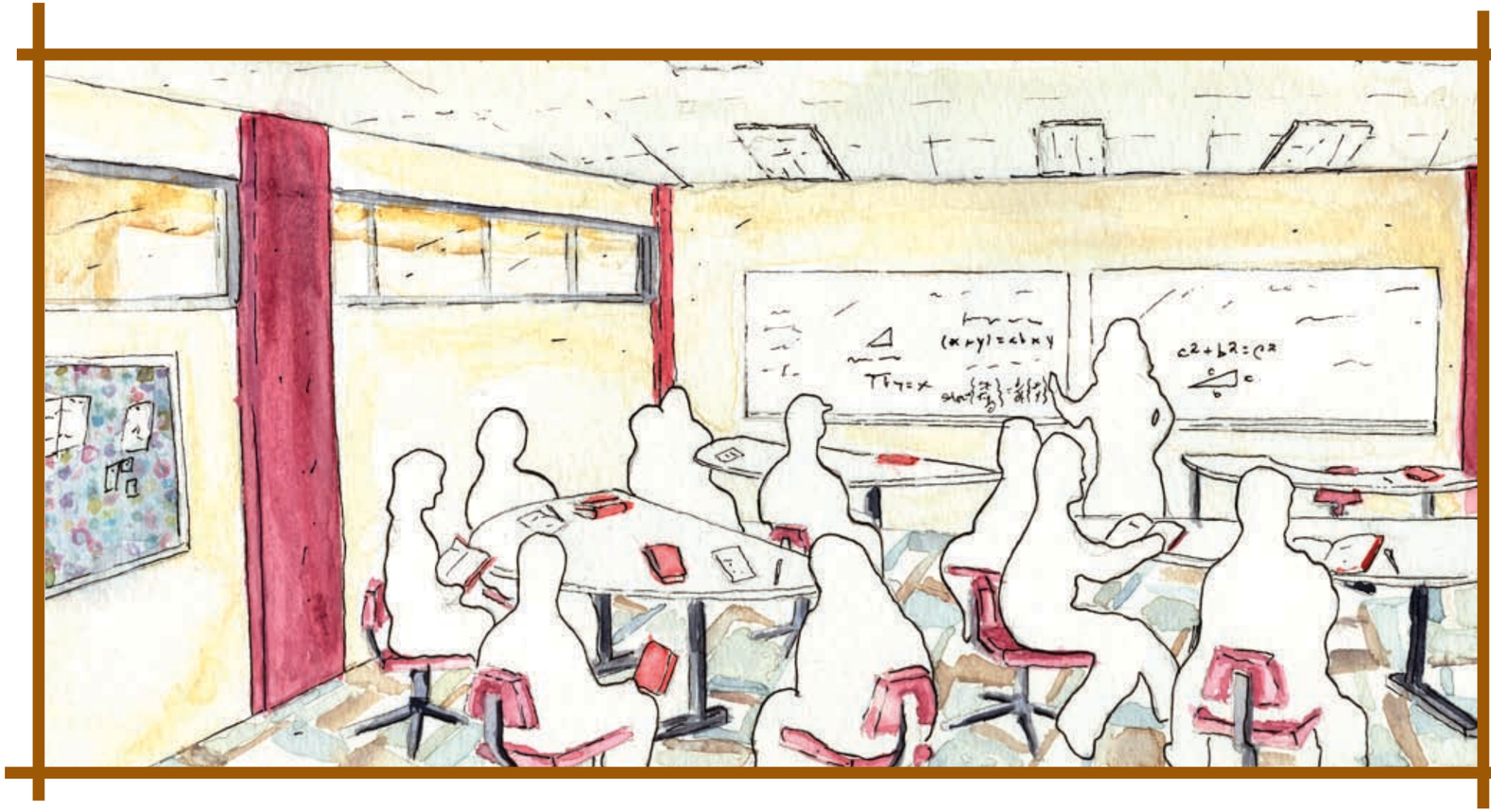


CHEMISTRY SUITE

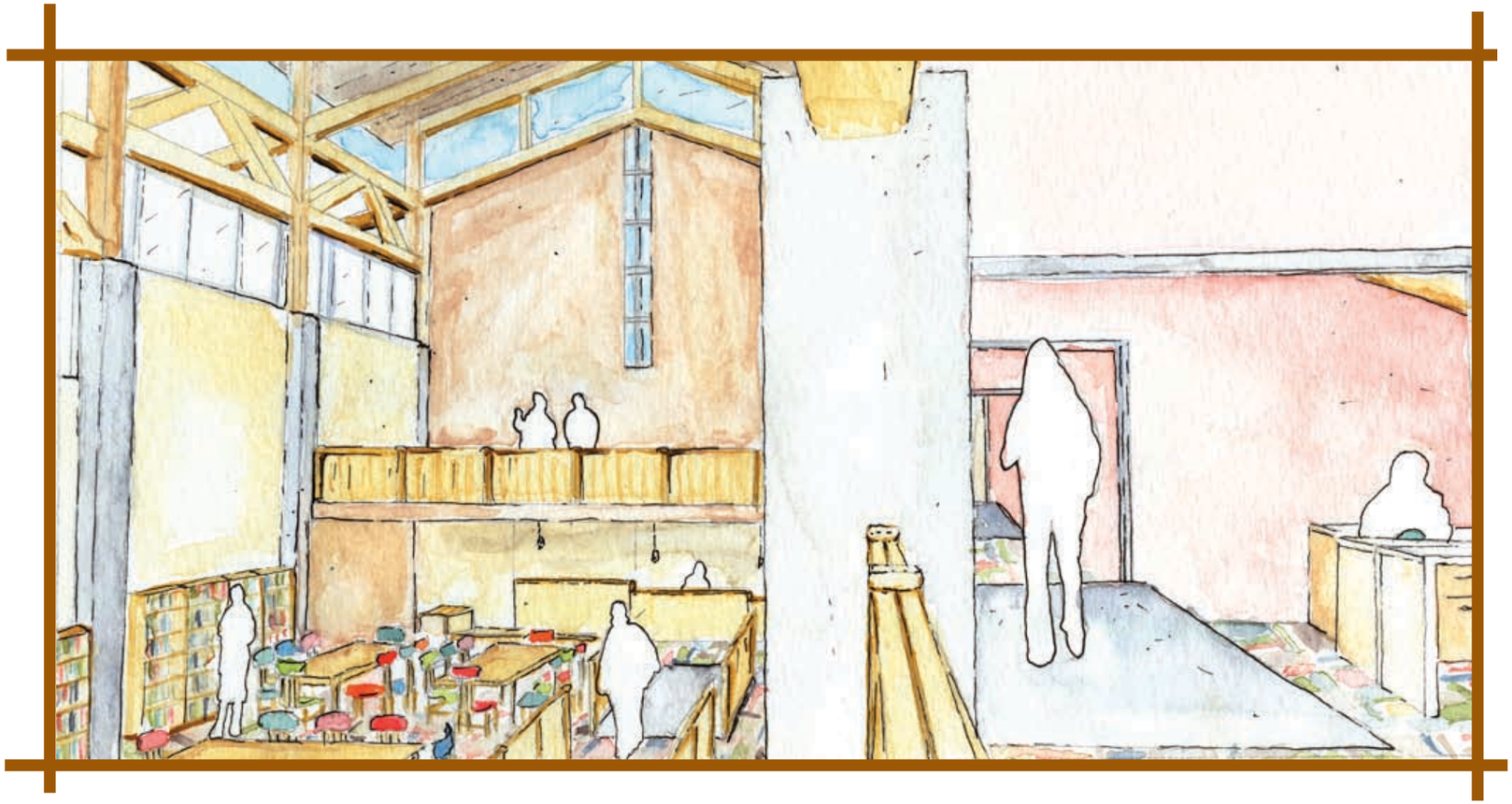


BOTANY SUITE

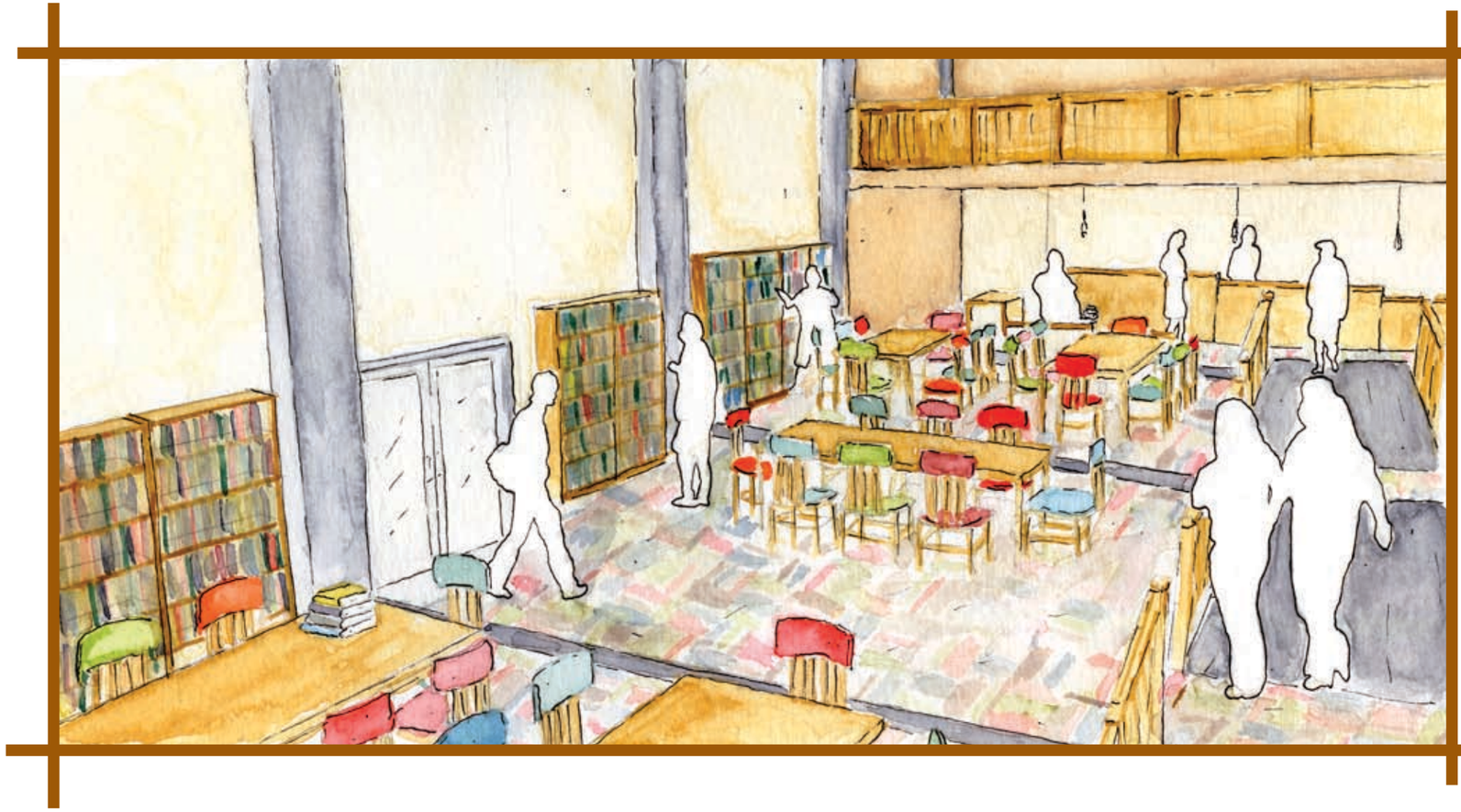




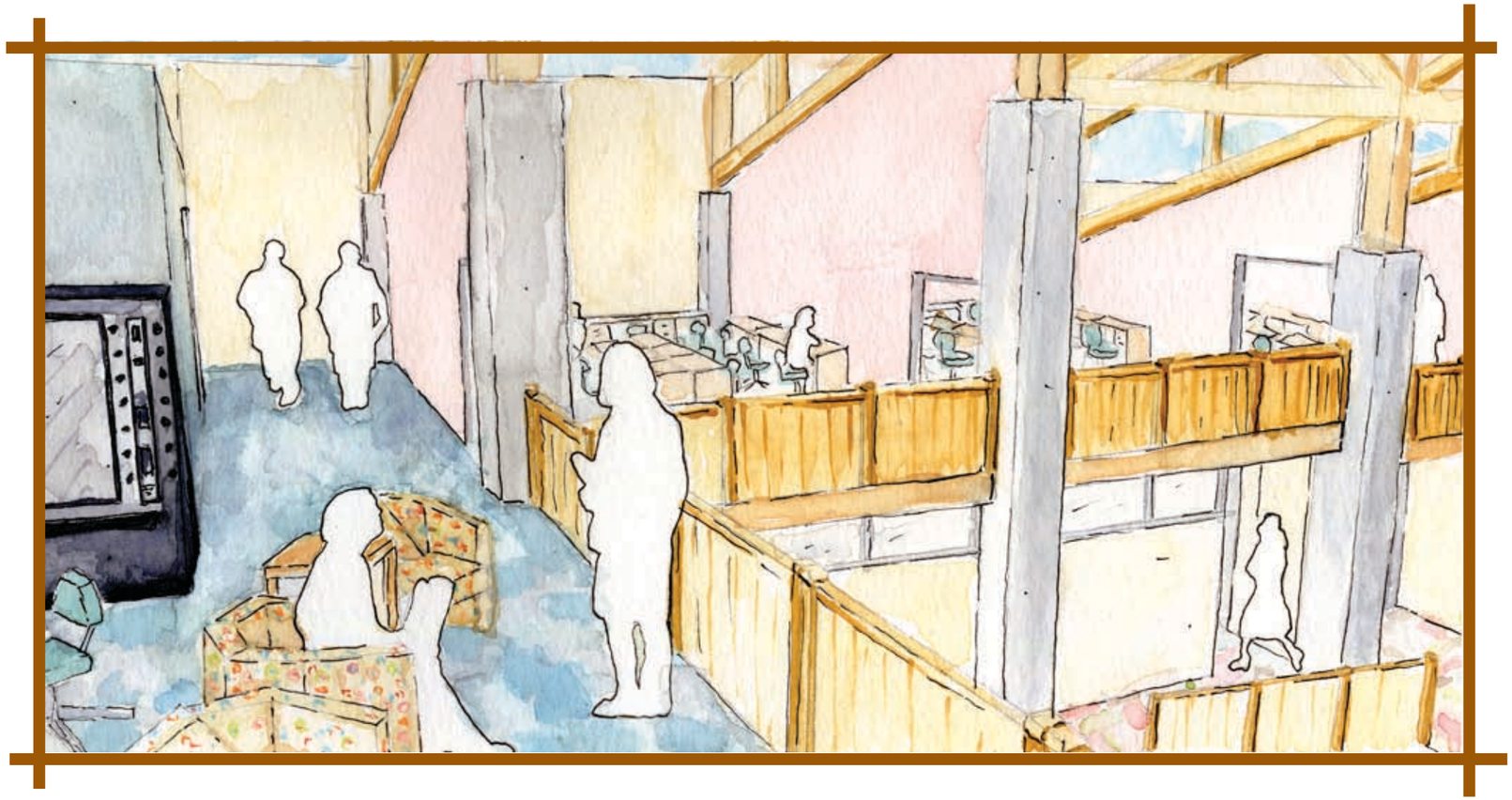
MATH CLASSROOM



LIBRARY, MEZZANINE & STUDENT LOUNGE



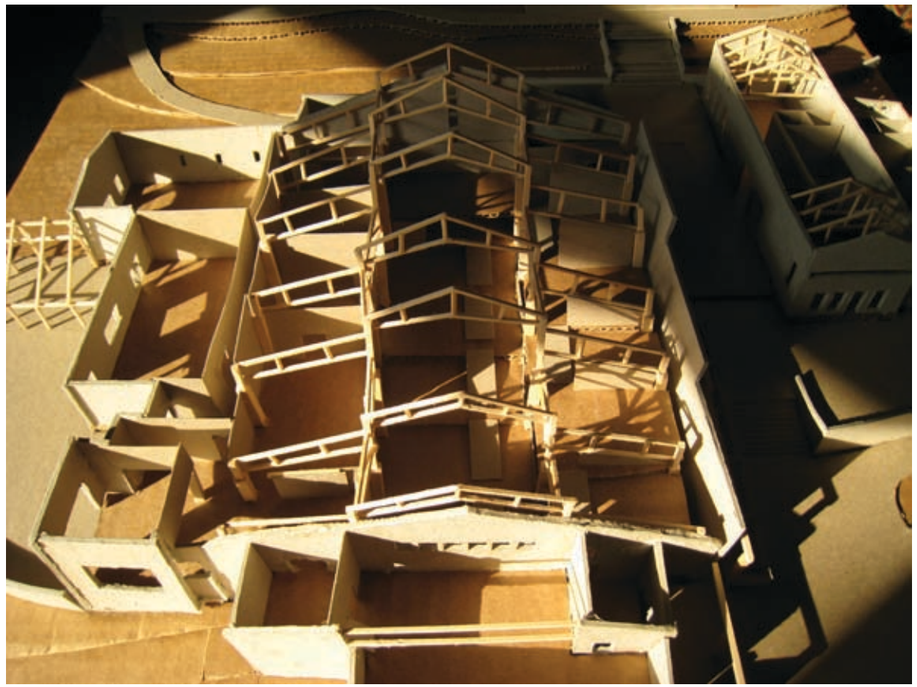
LIBRARY



MEZZANINE & STUDENT LOUNGE

TEACHER'S LOUNGE

MODEL



Scale: 3/32” = 1’-0”

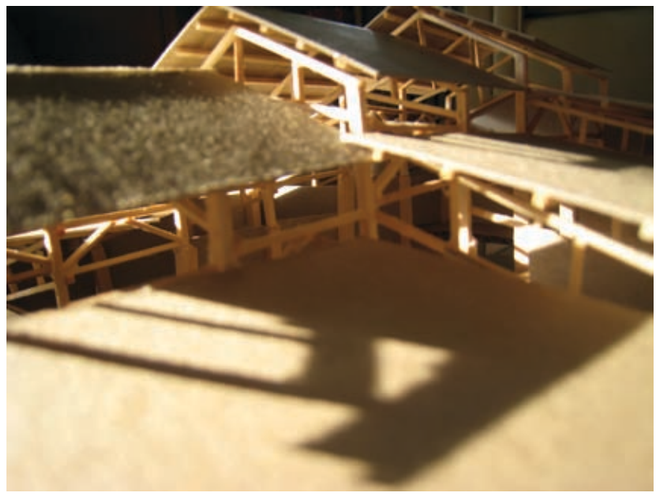
Construction:

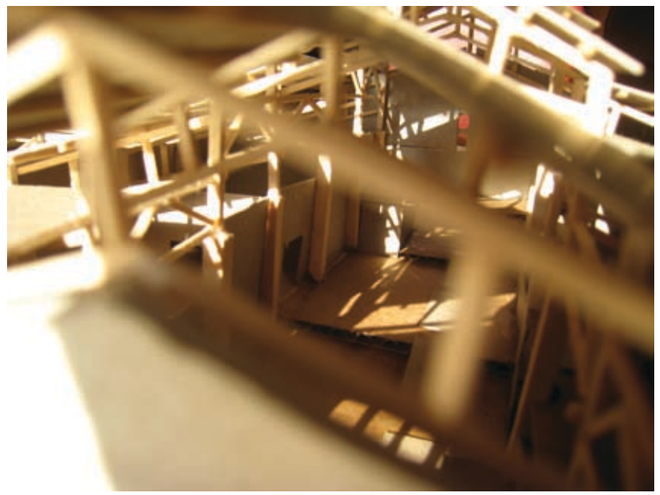
Basswood

Chipboard

Cardboard

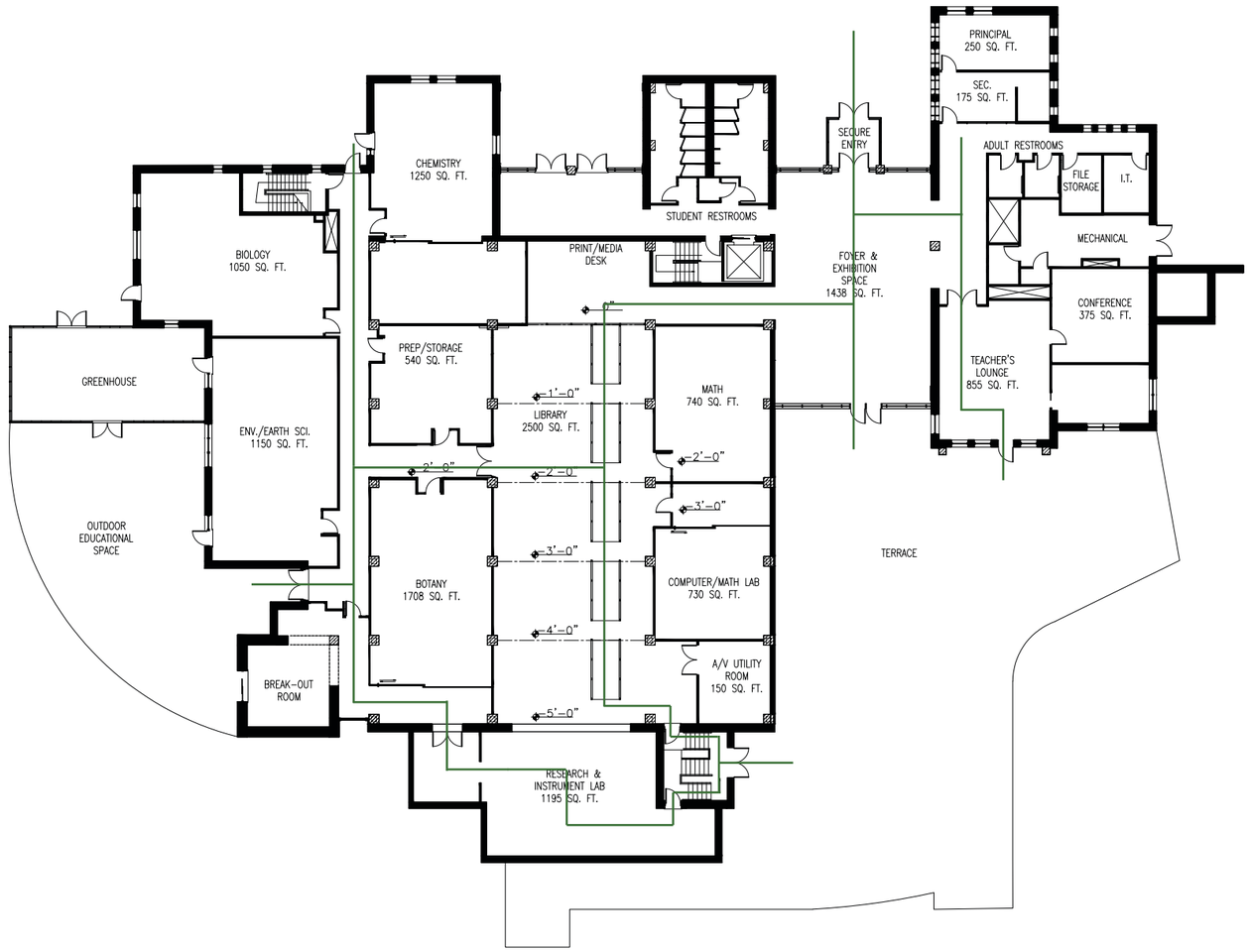
Base Size: 2’ x 2’

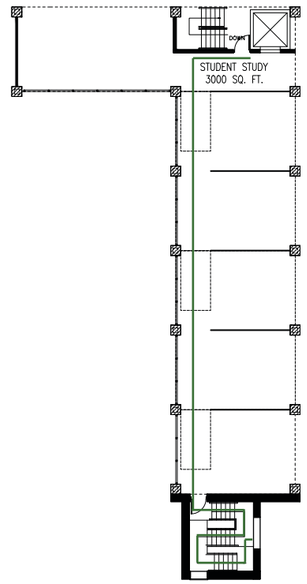




CODE OVERLAY

Circulation





Building & Code Information

Maymont's Square Footage: approx. 20,000 sq. ft.
SEC's Building & Mezzanine Square Footage: approx. 23,000 sq. ft.
Building Use: Educational (E)
Fire Protection: Sprinkled
Elevators: 1
Ramps: 8 ADA (1:12 & 6' wide)
Total Main Floor Exits: 12
Maximum Access Travel Distance: 250 ft.
Maximum Length of Common Path of Travel: 75 ft.
Exit Enclosures: 1 hour
Exit Corridors: 0 hour
Water Fountains: 8 total, 4 ADA
Restrooms: 4 total (2 M/F Adult, 2 M/F Student)
Toilets: 11 total, 4 ADA, 3 urinals

School Occupancy Requirement: ~ 170 sq. ft./student in a school
Based on Allowed Occupancy: ~ 110 students

SEC's Total Proposed capacity: 92 people
• 80 students (16 in 5 classes)
• 1 Principal
• 1 Secretary
• 6 Teachers
• 1 Prep/Storage
• 1 Media Desk
• 1 IT
• 1 Security
• 1 Janitorial

MATERIALS

#	Product	Pattern	Colorway	Location	Selection
1	Maharam Fabric - Main	Sudden	Flirt	Chemistry Suite	
2	Maharam Fabric - Coordinate	Ply Mesh	Unique	Chemistry Suite	
3	Maharam Fabric - Main	Sudden	Halt	Biology Suite	
4	Momentum Fabric - Coordinate	Topanga	Frost	Biology Suite	Main fabrics are used to distinguish each
5	Maharam Fabric - Main	Sudden	Mallard	Environmental Science Suite	suite with a signature color palette. Coordinate fabrics
6	Maharam Fabric - Coordinate	Sea Things	Aqua	Environmental Science Suite	accent the space and tie in the subject studied or inspiration.
7	Maharam Fabric - Main	Sudden	Squeeze	Botany Suite	
8	Maharam Fabric - Coordinate	Reef	Green	Botany Suite	
9	Maharam Fabric - Main	Sudden	Lipstick	Math Classroom	
10	Arc-COM Fabric - Coordinate	Bounce	Wild Plum	Math Classroom	
11	Maharam Fabric - Main	Sudden	Largo	Computer Lab	
12	Maharam Fabric - Coordinate	Binary	Turquoise	Computer Lab	
13	Momentum Fabric	Morphe	Sunrise	Mezzanine, Administration	Used throughout & ties together all main fabrics from suites.
14	Interface Modular Carpet Tile	First Act	Audition, Spotlight,	Library, Administration, Mezzanine,	Bright carpet tiles add vibrancy and color to the space and
			Script, Director	Math & Computer Classrooms	can easily be swapped out if damaged.
15	Interface Modular Carpet Tile	Linear Tonal	Aqua, Chablis	Mezzanine, Administration	
16	Wilsonart Laminate		Maple	Library	
17	Benjamin Moore Paint		Neutrals	Main Paints	
18	Tree Frog Laminate		Oak	All Science Suites	
19	Design Tex Fusion		Various	Chemistry	Resin panels are used for the partitions and provide an
	Architectural Panels			Botany	adjustable feature that links spaces while also providing
				Computer Lab	privacy.
				Mezzanine	
20	Forbo Sheet Vinyl - Main	Smaragd	Revolver	All Science Suites	Sheet vinyl that can be heat welded and coved is practical
21	Forbo Sheet Vinyl - Accent	Smaragd	Concrete	All Science Suites	for laboratory use.
22	Forbo Sheet Vinyl - Accent	Smaragd	Asparagus	Botany Suite	
23	Forbo Sheet Vinyl - Accent	Smaragd	Forest	Environmental Science Suite	
24	Forbo Sheet Vinyl - Accent	Smaragd	Henna	Biology Suite	
25	Forbo Sheet Vinyl - Accent	Smaragd	Casino	Chemistry Suite	
26	Benjamin Moore Paint		Various	Accent Paints for Suites	Accent paints correspond to color palettes in suites. Paired
					with a neutral paint to add color.

CASE STUDIES

Site Case Study: Ben Franklin Elementary

Overview:

Architect: Mahlum Architects

Location: Kirkland, WA

Building Type: Elementary Education

Year Completed: 2005

Square Footage: 56,800 sq. ft.

About:

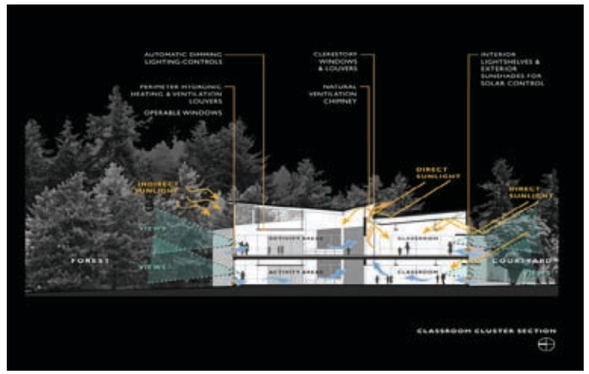
Ben Franklin Elementary School is a high-performance building that focuses on educational learning communities. The students are distributed within small learning communities, each including a cluster of four naturally ventilated and day-lit classrooms around a multipurpose activity area. Stacked within two-story wings that overlook the surrounding greenspace, these communities, are integrally together with the outdoors .

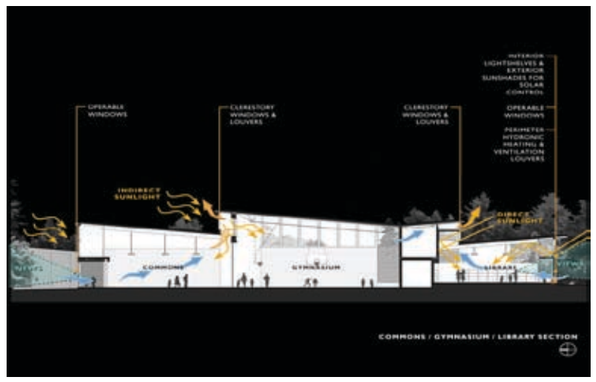
By connecting the schools pedagogy to the outdoors, the students' learning is expanded to include an appreciation for nature and sustainability. Outdoor educational spaces, gardens and rainwater collection are all ways that the school utilizes the surroundings expands learning beyond the classroom.

Because daylight and indoor air quality profoundly impact student performance, the school was designed to maximize performance in these areas. The classroom areas of the school are entirely naturally ventilated and day-lit, decreasing the reliance .

-Information and photos courtesy of Building Green, Inc.

Focus for Case Study: School's pedagogy & building materials.





Site Case Study: Schlitz Audubon Nature Center

Overview:

Architects: The Kubala Washatko Architects, Inc.

Location: Milwaukee, Wisconson

Building Type: Nature Center

Year Built: 2003

Square Footage: 35000 sq. ft.

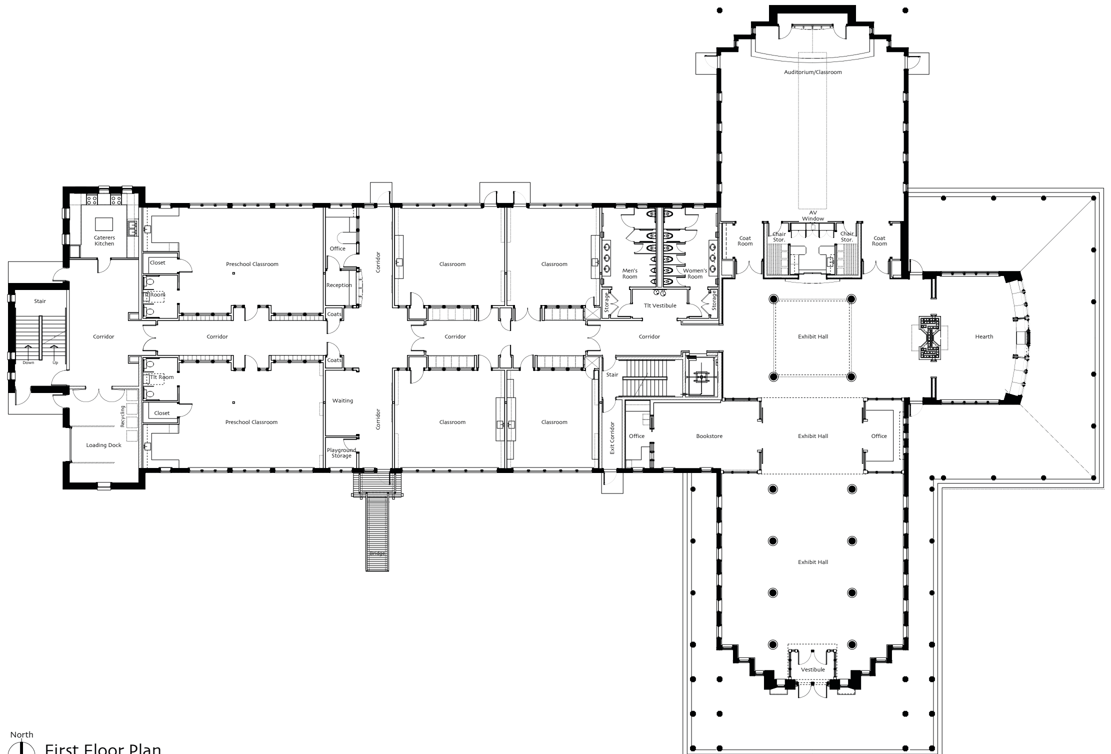
About:

The mission of the Schlitz Audubon Nature Center is to promote an appreciation, understanding and stewardship of our natural heritage through environmental education and sanctuary preservation. It was only natural then, for the Center to build its new Dorothy K. Vallier Environmental Learning Center with environmental sustainability in mind. With the assistance of Johnson Controls, Inc., the Center achieved a Gold rating under the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program upon construction of the facility. Founded in 1971 and named after the Joseph Schlitz Brewing Company, the Schlitz Audubon Center is located on 185 acres of natural beauty along the shores of Lake Michigan, north of Milwaukee, Wisconsin.

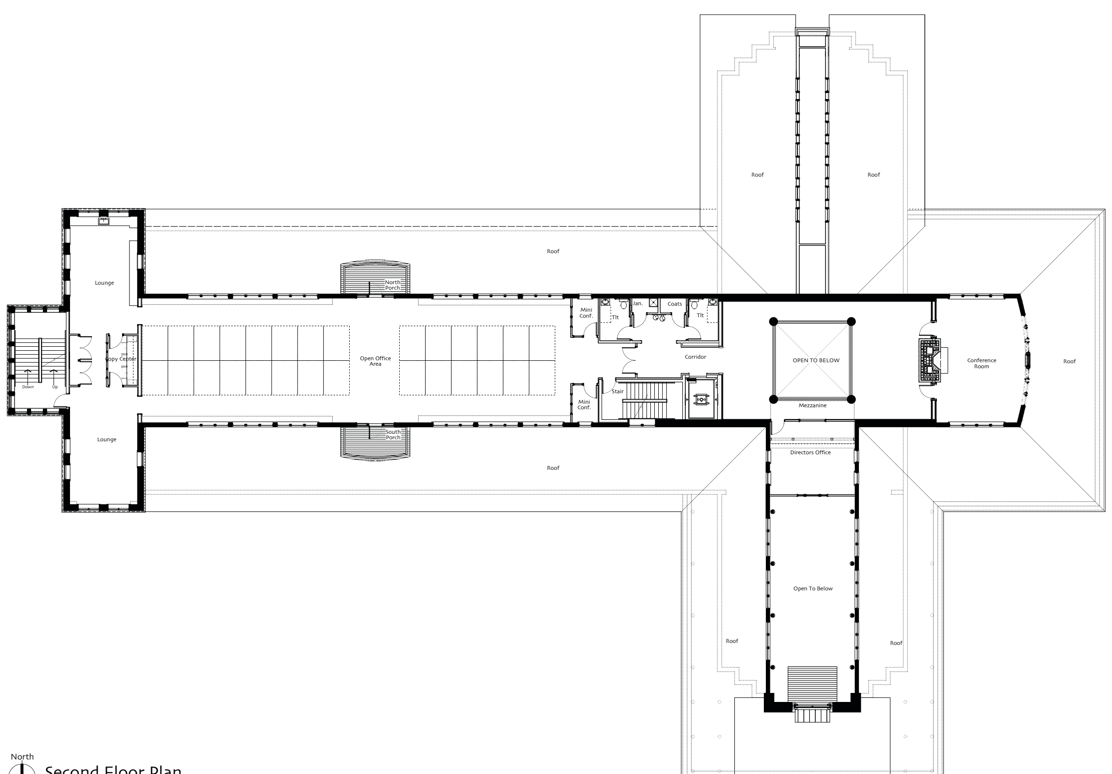
The land was first used to field the brewery's draft horses, then later as a recreational area. Presently, the Center offers classes and programs for all ages and annually teaches thousands of young children about nature, using its land as an outdoor classroom. The 35,000-square-foot learning center– the first of its kind in Wisconsin, provides much needed space for classrooms, an enlarged auditorium, new exhibits, a nature preschool, a nature store and improved access for persons with disabilities.

-Information & photos courtesy of schlitzaudubon center.com. Drawings courtesy of Joel Krueger at TKWA.

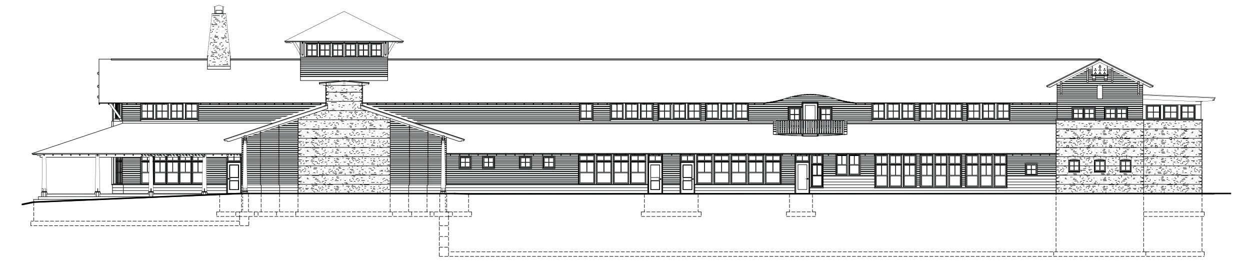
Case Study Focus: Similar program, terrain, building plan, height, great hall, & materials.



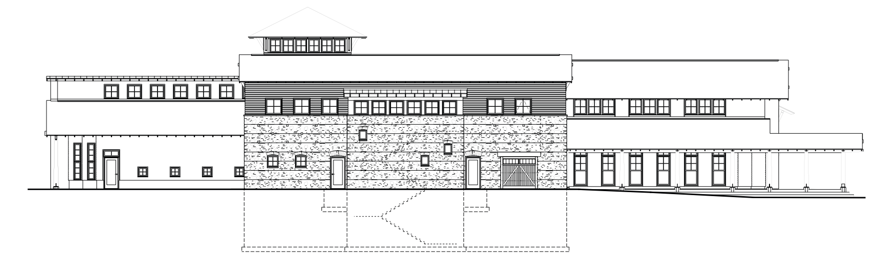
First Floor Plan



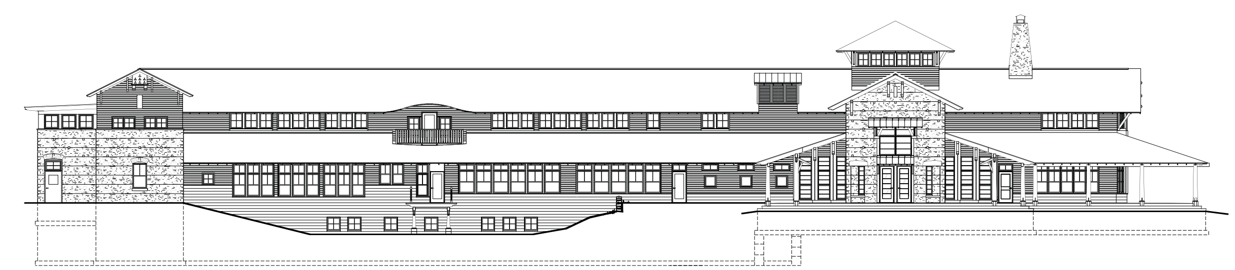
Second Floor Plan



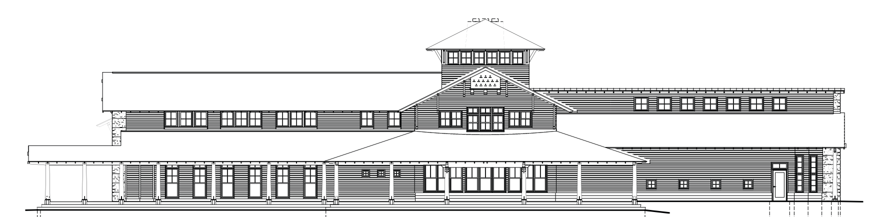
North Elevation



West Elevation



South Elevation



East Elevation

Site Case Study: Fallingwater

Overview:

Architect: Frank Lloyd Wright

Location: Mill Run, Pennsylvania

Building Type: Residential

Year Built: 1935

Square Footage: 5300 sq. ft.

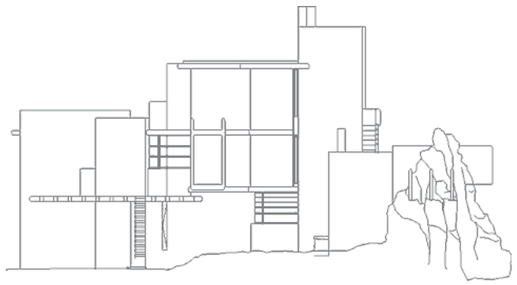
About:

Fallingwater is recognized as one of Wright's most acclaimed works, and in a 1991 poll of members of the American Institute of Architects, it was voted "the best-all time work of American architecture."

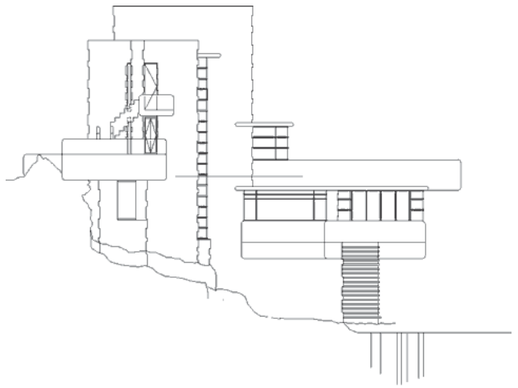
The building is a supreme example of Frank Lloyd Wright's concept of organic architecture, which promotes harmony between man and nature through design so well integrated with its site that buildings, furnishings, and surroundings become part of a unified, interrelated composition.

-Information, photos & drawings courtesy of fallingwater.com and Fallingwater, 1994.

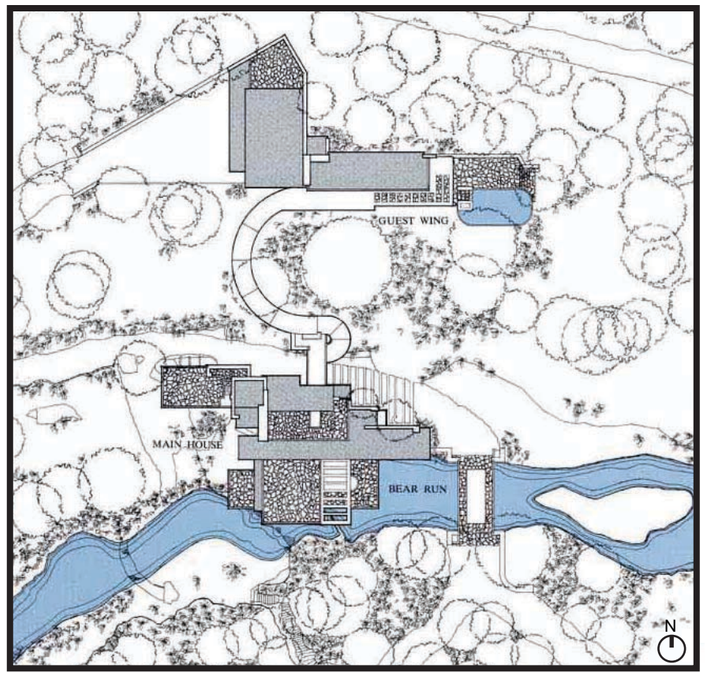
Case Study Focus: Building's connection to site & similar footprint

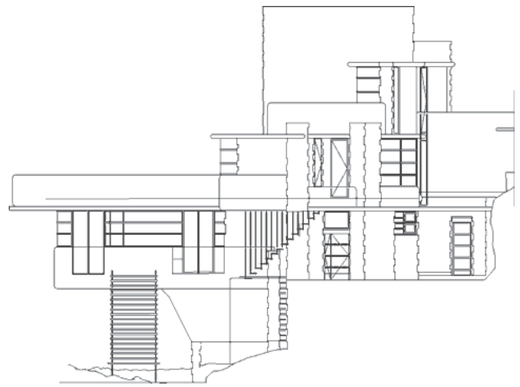


North

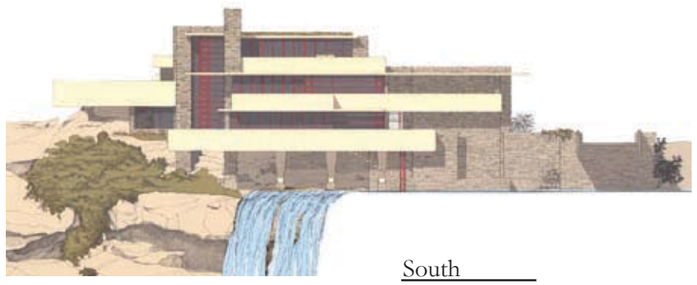


West





East



South

Process Case Study: Andy Goldsworthy

Profession: Sculptor, Photographer, Environmentalist

Born: July 26, 1956, England

About:

Few contemporary artists are as beloved as Andy Goldsworthy, an Englishman who specializes in constructing ephemeral works out of natural materials -- leaves, reeds, twigs, stones, ice, clay, petals, wind, water, gravity, darkness, light. Making them all the more special, many of his creations last only for hours or days, until wind, sun, or flowing water takes them away.

Goldsworthy creates what J. R. R. Tolkien called a "Secondary World," made of the stuff of the Primary World of nature but reshaped by imagination. "The mind that thought of light, heavy, grey, yellow, still, swift, also conceived of magic that would make heavy things light and able to fly, turn grey lead into yellow gold, and the still rock into a swift water," wrote Tolkien. The artist who would create such worlds, he observed, requires an "elvish craft." Elvish craft is what Andy Goldsworthy possesses in abundance.

Goldsworthy's art reminds us how precious is the Primary World we are using up, paving over, chopping down, draining dry. He has no quarrel with modern civilization. What he asks for is a new alliance with the Earth, informed by science and technology, yet transparent to mystery -- a re-enchantment in the Tolkien sense. It is impossible to look at a Goldsworthy work -- a river boulder, say, wrapped in red poppy petals -- without feeling that one has entered the world of faries: nature transformed by impish imagination.

-Information courtesy Chet Raymo, sciencemusings.com

Case Study Focus: Design methods

Process Case Study: Christopher Alexander

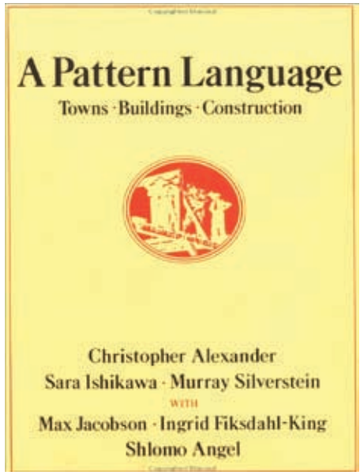
Profession: Architect

Born: October 4, 1936, Austria

About:

Christopher Alexander is an architect noted for his theories about design, and for more than 200 building projects in California, Japan, Mexico and around the world. Reasoning that users know more about the buildings they need than any architect could, he produced and validated (in collaboration with Sarah Ishikawa and Murray Silverstein) a "pattern language" designed to empower any human being to design and build at any scale. Christopher Alexander is now a professor emeritus at the University of California, Berkeley.

A Pattern Language: Towns, Buildings, Construction describes a practical architectural system in a form that a theoretical mathematician or computer scientist might call a generative grammar. The work originated from an observation that many medieval cities are attractive and harmonious. The authors said that this occurs because they were built to local regulations that required specific features, but freed the architect to adapt them to particular situations. The book provides rules and pictures, and leaves decisions to be taken from the precise environment of the project. It describes exact methods for constructing practical, safe and attractive designs at every scale, from entire regions, through cities, neighborhoods, gardens, buildings, rooms, built-in furniture, and fixtures down to the level of doorknobs. A notable value is that the architectural system consists only of classic patterns tested in the real world and reviewed by multiple architects for beauty and practicality. The book includes all needed surveying and structural calculations, and a novel simplified building system that copes with regional shortages of wood and steel, uses easily-stored inexpensive materials, and produces long-lasting classic buildings with small amounts of materials, design and labor. This book's method was adopted by the University of Oregon, as described in
The Oregon Experiment and remains the official planning instrument.
It has also been adopted in part by some cities as a building code.



-Information courtesy of patternlanguage.com

Case Study Focus: Analysis of Building & Site

TOWNS 1. INDEPENDENT REGIONS 2. THE DISTRIBUTION OF TOWNS 3. CITY COUNTRY FINGERS 4. AGRICULTURAL VALLEYS 5. LACE OF COUNTRY STREETS 6. COUNTRY TOWNS 7. THE COUNTRYSIDE 8. MOSAIC OF SUBCULTURES 9. SCATTERED WORK 10. MAGIC OF THE CITY 11. LOCAL TRANSPORT AREAS 12. COMMUNITY OF 7000 13. SUBCULTURE BOUNDARY 14. IDENTIFIABLE NEIGHBORHOOD 15. NEIGHBORHOOD BOUNDARY 16. WEB OF PUBLIC TRANSPORTATION 17. RING ROADS 18. NETWORK OF LEARNING 19. WEB OF SHOPPING 20. MINI-BUSES 21. FOUR-STORY LIMIT 22. NINE PER CENT PARKING 23. PARALLEL ROADS 24. SACRED SITES 25. ACCESS TO WATER 26. LIFE CYCLE 27. MEN AND WOMEN 28. ECCENTRIC NUCLEUS 29. DENSITY RINGS 30. ACTIVITY NODES 31. PROMENADE 32. SHOPPING STREET 33. NIGHT LIFE 34. INTERCHANGE 35. HOUSEHOLD MIX 36. DEGREES OF PUBLICNESS 37. HOUSE CLUSTER 38. ROW HOUSES 39. HOUSING HILL 40. OLD PEOPLE EVERYWHERE 41. WORK COMMUNITY 42. INDUSTRIAL RIBBON 43. UNIVERSITY AS A MARKETPLACE 44. LOCAL TOWN HALL 45. NECKLACE OF COMMUNITY PROJECTS 46. MARKET OF MANY SHOPS 47. HEALTH CENTER 48. HOUSING IN BETWEEN 49. LOOPED LOCAL ROADS 50. JUNCTIONS 51. GREEN STREETS 52. NETWORK OF PATHS AND CARS 53. MAIN GATEWAYS 54. ROAD CROSSING 55. RAISED WALKS 56. BIKE PATHS AND RACKS 57. CHILDREN IN THE CITY 58. CARNIVAL 59. QUIET BACKS 60. ACCESSIBLE GREEN 61. SMALL PUBLIC SQUARES 62. HIGH PLACES 63. DANCING IN THE STREET 64. POOLS AND STREAMS 65. BIRTH PLACES 66. HOLY GROUND 67. COMMON LAND 68. CONNECTED PLAY 69. PUBLIC OUTDOOR ROOM 70. GRAVE SITES 71. STILL WATER 72. LOCAL SPORTS 73. ADVENTURE PLAYGROUND 74. ANIMALS 75. FAMILY 76. HOUSE FOR A SMALL FAMILY 77. HOUSE FOR A COUPLE 78. HOUSE FOR ONE PERSON 79. YOUR OWN HOME 80. SELF-GOVERNING WORKSHOPS AND OFFICES 81. SMALL SERVICES WITHOUT RED TAPE 82. OFFICE CONNECTIONS 83. MASTER AND APPRENTICES 84. TEENAGE SOCIETY 85. SHOP FRONT SCHOOLS 86. CHILDREN'S HOME 87. DIVIDUALLY OWNED SHOPS 8. STREET CAFE 89. CORNER GROCERY 90. BEER HALL 91. TRAVELER'S INN 92. BUS STOP 93. FOOD STANDS 94. SLEEPING IN PUBLIC **BUILDINGS** 95. BUILDING COMPLEX 96. NUMBER OF STORIES 97. SHIELDED PARKING 98. CIRCULATION REALMS 99. MAIN BUILDING 100. PEDESTRIAN STREET 101. BUILDING THOROUGHFARE 102. FAMILY OF ENTRANCES 103. SMALL PARKING LOTS 104. SITE REPAIR 105. SOUTH FACING OUTDOORS 106. POSITIVE OUTDOOR SPACE 107. WINGS OF LIGHT 108. CONNECTED BUILDINGS 109. LONG THIN HOUSE 110. MAIN ENTRANCE 111. HALF-HIDDEN GARDEN 112. ENTRANCE TRANSITION 113. CAR CONNECTION 114. HIERARCHY OF OPEN SPACE 115. COURTYARDS WHICH LIVE 116. CASCADE OF ROOFS 117. SHELTERING ROOF 118. ROOF GARDEN 119. ARCADES 120. PATHS AND GOALS 121. PATH SHAPE 122. BUILDING FRONTS 123. PEDESTRIAN DENSITY 124. ACTIVITY POCKETS 125. STAIR SEATS 126. SOMETHING ROUGHLY IN THE MIDDLE 127. INTIMACY GRADIENT 128. INDOOR SUNLIGHT 129. COMMON AREAS AT THE HEART 130. ENTRANCE ROOM 131. THE FLOW THROUGH ROOMS 132. SHORT PASSAGES 133. STAIRCASE AS A STAGE 134. ZEN VIEW 135. TAPESTRY OF LIGHT AND DARK 136. COUPLE'S REALM 137. CHILDREN'S REALM 138. SLEEPING TO THE EAST 139. FARMHOUSE KITCHEN 140. PRIVATE TERRACE ON THE STREET 141. A ROOM OF ONE'S OWN 142. SEQUENCE OF SITTING SPACES 143. BED CLUSTER 144. BATHING ROOM 145. BULK STORAGE 146. FLEXIBLE OFFICE SPACE 147. COMMUNAL EATING 148. SMALL WORK GROUPS 149. RECEPTION WELCOMES YOU 150. A PLACE TO WAIT 151. SMALL MEETING ROOMS 152. HALF-PRIVATE OFFICE 153. ROOMS TO RENT 154. TEENAGER'S COTTAGE 155. OLD AGE COTTAGE 156. SETTLED WORK 157. HOME WORKSHOP 158. OPEN STAIRS 159. LIGHT ON TWO SIDES OF EVERY ROOM 160. BUILDING EDGE 161. SUNNY PLACE 162. NORTH FACE 163. OUTDOOR ROOM 164. STREET WINDOWS 165. OPENING TO THE STREET 166. GALLERY SURROUND 167. SIX-FOOT BALCONY 168. CONNECTION TO THE EARTH 169. TERRACED SLOPE 170. FRUIT TREES 171. TREE PLACES 172. GARDEN GROWING WILD 173. GARDEN WALL 174. TRELLISED WALK 175. GREENHOUSE 176. GARDEN SEAT 177. VEGETABLE GARDEN 178. COMPOST 179. ALCOVES 180. WINDOW PLACE 181. THE FIRE 182. EATING ATMOSPHERE 183. WORKSPACE ENCLOSURE 184. COOKING LAYOUT 185. SITTING CIRCLE 186. COMMUNAL SLEEPING 187. MARRIAGE BED 188. BED ALCOVE 189. DRESSING ROOM 190. CEILING HEIGHT VARIETY 191. THE SHAPE OF INDOOR SPACE 192. WINDOWS OVERLOOKING LIFE 193. HALF-OPEN WALL 194. INTERIOR WINDOWS 195. STAIRCASE VOLUME 196. CORNER DOORS 197. THICK WALLS 198. CLOSETS BETWEEN ROOMS 199. SUNNY COUNTER 200. OPEN SHELVES 201. WAIST-HIGH SHELF 202. BUILT-IN SEATS 203. CHILD CAVES 204. SECRET PLACE **CONSTRUCTION** 205. STRUCTURE FOLLOWS SOCIAL SPACES 206. EFFICIENT STRUCTURE 207. GOOD MATERIALS 208. GRADUAL STIFFENING 209. ROOF LAYOUT 210. FLOOR AND CEILING LAYOUT 211. THICKENING THE OUTER WALLS 212. COLUMNS AT THE CORNERS 213. FINAL COLUMN DISTRIBUTION 214. ROOT FOUNDATIONS 215. GROUND FLOOR SLAB 216. BOX COLUMNS 217. PERIMETER BEAMS 218. WALL MEMBRANES 219. FLOOR-CEILING VAULTS 220. ROOF VAULTS 221. NATURAL DOORS AND WINDOWS 222. LOW SILL 223. DEEP REVEALS 224. LOW DOORWAY 225. FRAMES AS THICKENED EDGES 226. COLUMN PLACE 227. COLUMN CONNECTION 228. STAIR.VAULT 229. DUCT SPACE 230. RADIANT HEAT 231. DORMER WINDOWS 232. ROOF CAPS 233. FLOOR SURFACE 234. LAPPED OUTSIDE WALLS 235. SOFT INSIDE WALLS 236. WINDOWS WHICH OPEN WIDE 237. SOLID DOORS WITH GLASS 238. FILTERED LIGHT 239. SMALL PANES 240. HALF-INCH TRIM 241. SEAT SPOTS 242. FRONT DOOR BENCH 243. SITTING WALL 244. CANVAS ROOFS 245. RAISED FLOWERS 246. CLIMBING PLANTS 247. PAVING WITH CRACKS BETWEEN THE STONES 248. SOFT TILE AND BRICK 249. ORNAMENT 250. WARM COLORS 251. DIFFERENT CHAIRS 252. POOLS OF LIGHT 253. THINGS FROM YOUR LIFE

Process Case Study: Steven Holl

Profession: Architect

Born: December 9, 1947, U.S.

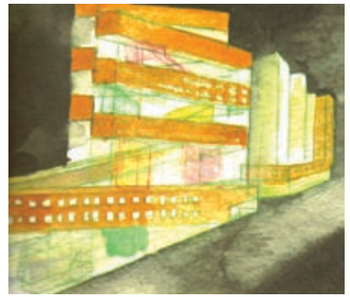
About:

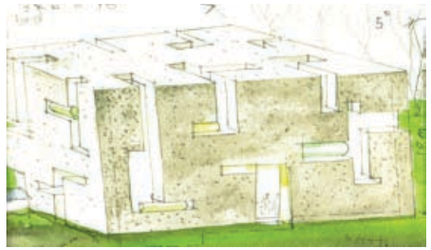
The success of Steven Holl's architecture derives from his sculptural shapes, his watercolor imagery, his interest in the poetics of space color, and material, as well as his fascination with scientific phenomena. His work refers to urban history and the potentials of modern science.

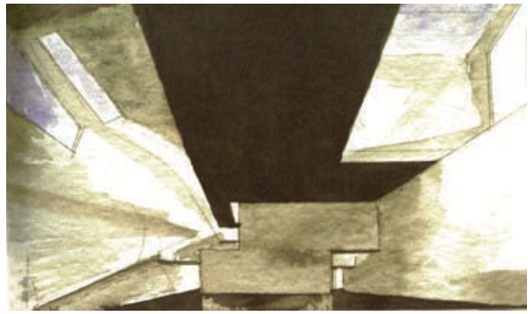
"It is precisely the realm of ideas - not of forms or styles - that presents the most promising legacy of twentieth-century architecture. The twenty-first century propels architecture into historical languages. Modern life brings with it the problem of the meaning of the larger whole. The increased size and programmatic complexity of buildings amplify the innate tendency of architecture toward abstraction. The tall office building, the urban apartment house, and the hybrid of commercial complex call for more open ideas more imaginative organization of a work of architecture. Organization of overall form depends on a central concept to which other elements remain subordinate." – Steven Holl

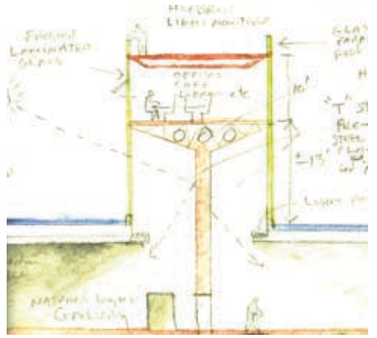
-Information & photos courtesy of Holl, Written in Water

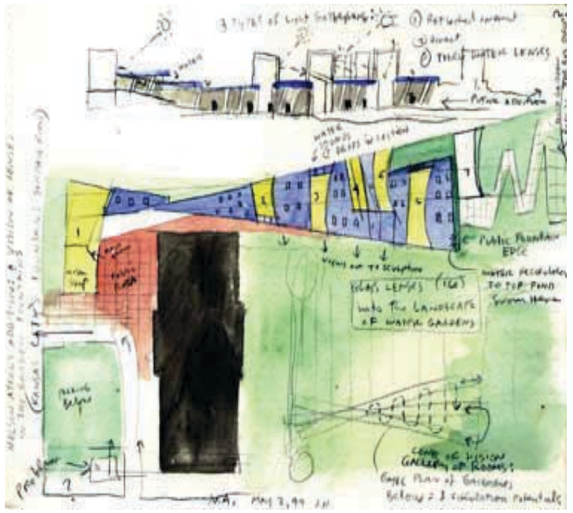
Case Study Focus: Watercolor Techniques

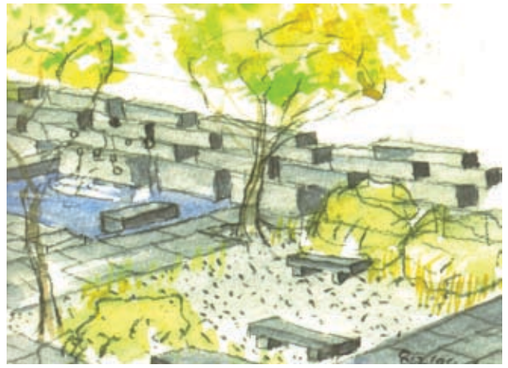












Program Case Study: Center for Advanced Studies and the Arts

Location: Oak Park, Michigan

Grades: 11-12

School Size: 40,000 sq. ft.

School Capacity: 400 students

School Started: 1983/2002

CASA is a cross-district consortium program that includes partnerships with six different neighboring districts. High school students who participate in CASA study many unique classes not usually available in traditional schools, including dance, sculpture, Japanese, Russian, philosophy, or advanced placement statistics, world mythology, debate and forensics, global issues, and computer networking. CASA also offers eight Advanced Placement classes through which students can earn college credit. Students attend CASA in the afternoons after morning instruction at their home-base school and are able to receive outstanding instruction within CASA's diversified setting.

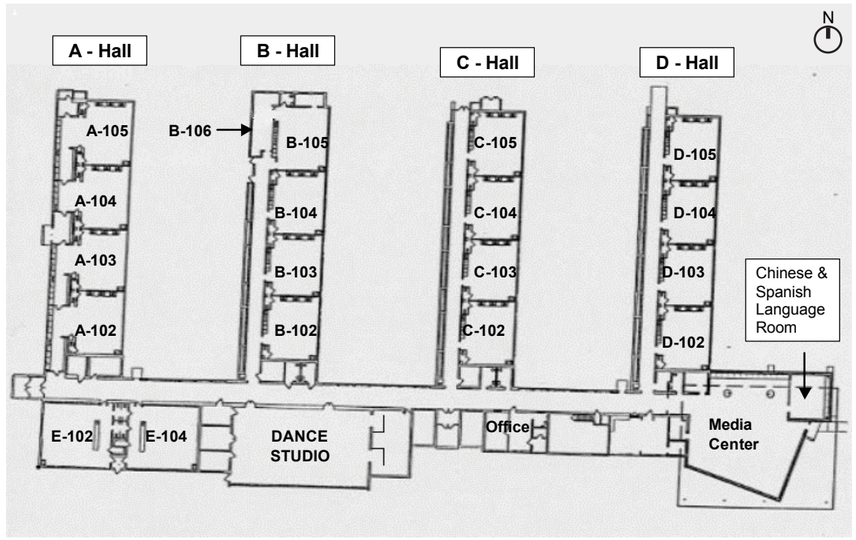
The CASA concept was born in the 1980's out of a desire to offer a larger variety of high level courses by high schools with limited funding. At the time, four classes were offered with an enrollment of 35 students. In 1986, Madison School District joined the consortium and in 1987, Clawson School District. By this time, 21 classes were offered and 280 students were registered. In 2001, The Lamphere Schools joined CASA, bringing the total to six participating school districts. Current enrollment runs between 370-400 students. Nineteen of the 41 courses offered at CASA are Advanced Placement, which enable students to earn college credit upon successful completion of the College Board Examination in May.

CASA is housed in the Jackson Center for Advanced Studies and the Arts, a centrally located facility in the City of Oak Park. Students may select to drive to CASA; however, bus transportation to and from CASA is available to those students wishing to use it. CASA moved to its new location in 2002. Still located in the City of Oak Park, the building belongs to the Ferndale School District. Seven rooms needed renovation; changing an elementary school to meet the demands of a high school program is not without its share of problems. Science rooms, computer rooms, art rooms, and another dance studio with a changing room were additions.

-Information & photos courtesy of casa-online.org & ferndale-mi.com

Case Study Focus: Program & Curriculum

Floor Plan



Key

A 102 - AP English Language & Philosophy
A 103 - AP European & U.S. History
A 104 - AP studio art & drawing
A 105 - Sculpture & AP 3-D Art Studio
B 102 - Dance studio
B 103 - Music Theory & Chamber music
B 104 - AP Geography
B 105 - Chinese
B 105 - Criminal Justice
C 102 - AP Psychology
C 103 - AP Comp. Government & Military
C 104 - Russian 1 & 2
C 105 - Japanese 1 & 2
D 102 - Forensics
D 103 – Comp. Religions & 60's Literature
D 104 - AP Statistics & AP Calculus
D 105 - World mythology
Media Center - AP Spanish & Intro to Ethics
E 102 - Genetics & Environmental Science
E 104 - AP Chemistry & AP Physics

Program Case Study: MAGGIE L. WALKER GOVERNOR'S SCHOOL

Location: Richmond, Virginia

Grades: 9-12

School Size: 150,000 sq. ft.

School Capacity: 1,200 students

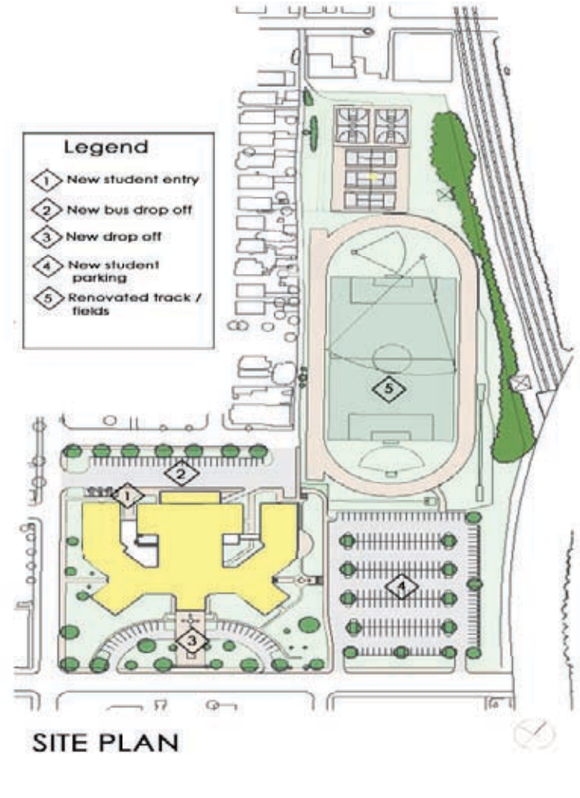
School Started: 2001

About:

The Maggie L. Walker Governor's School for Government and International Studies is a regional high school specifically for gifted students competitively selected from thirteen Richmond area school districts. The educational program is that of a comprehensive high school with a challenging curriculum focused on government and international studies. Drawing from an eleven-year history of innovative curriculum and teaching, the school embodies student-centered instruction: a true "Breaking Ranks" institution. It is a model for innovative teaching in the region, sharing successful methodology with the participating districts.

-Information & photos courtesy of designshare.com

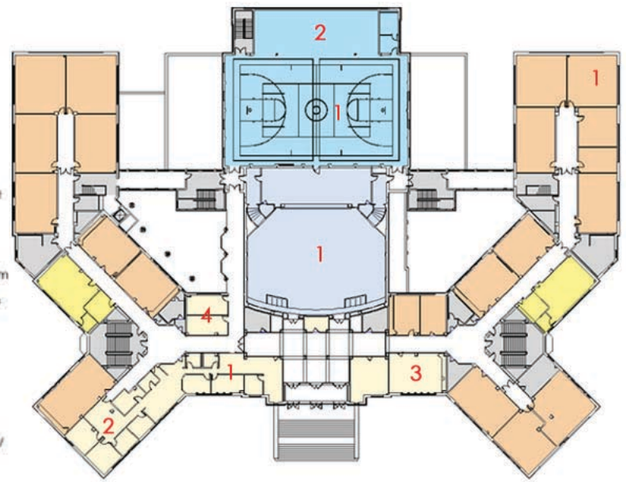
Case Study Focus: Program & Curriculum



SITE PLAN

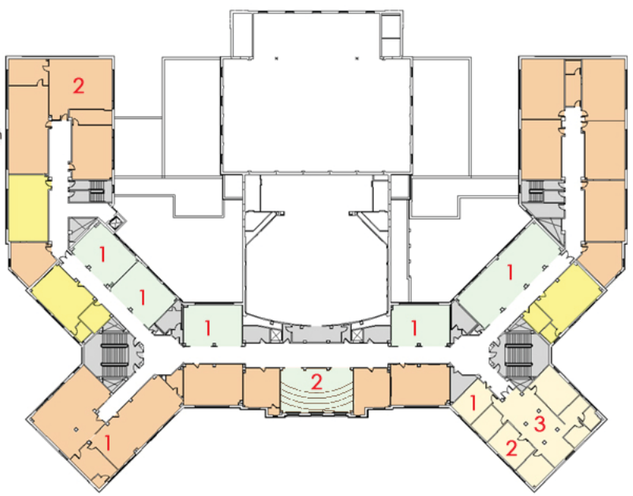
GROUND FLOOR PLAN

- Classrooms
  1 Physics
  2 Technology
  3 College Classroom
- Specialty Areas
  1 Music
  2 Art
  3 Black Box Theater
  4 Broadcast
- Media Technology
  1 Media Center
  2 Multi Media Concert Studio
  3 Computer Lab
  4 Data Center
- Commons / Auditorium
  1 Student Commons
  2 Cafeteria Commons
- Physical Education
  1 Fitness Center
  2 Health
  3 Locker Rooms
- Administration
  1 Assistant Principal
  2 Clinic / Attendence / Security
- Teacher Offices / Workrooms
- Support



FIRST FLOOR PLAN

- Classrooms
  1 Language Lab
- Commons / Auditorium
  1 Auditorium
- Physical Education
  1 Gymnasium
  2 Bleacher Addition
- Administration
  1 Main Office
  2 Main Guidance
  3 Board Room and Museum
  4 PTA Offices
- Teacher Offices / Workrooms
- Support



SECOND FLOOR PLAN

- Classrooms
  1 Chemistry
  2 Biology
- Specialty Areas
  1 Senior Commons
  2 Forum
- Administration
  1 Assistant Principal
  2 Career Center
  3 Guidance
- Teacher Offices / Workrooms
- Support

Program Case Study: NUS High School of Math & Science

Location: Singapore

Grades: 6-12

School Size: 444,00 sq. ft.

School Capacity: 1,200 students

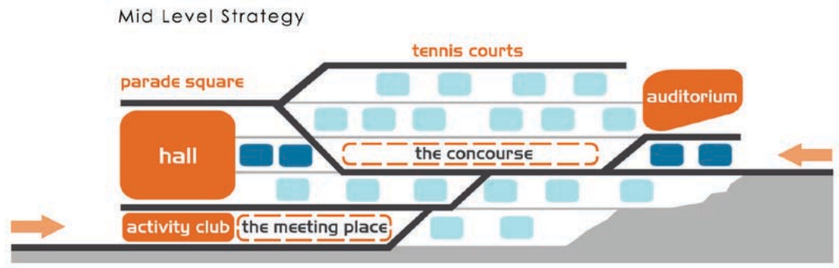
School Started: 2005

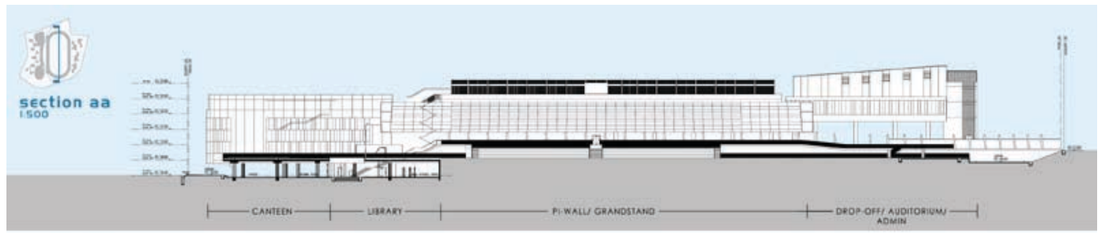
About:

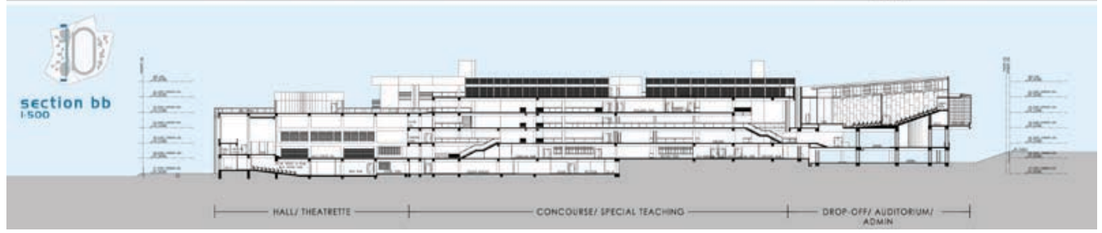
A first of its kind high school in Singapore to be developed and managed by a University, which aims to provide a stimulating environment for students with special aptitude in mathematics and science. This project marks a critical milestone in the development of schools in Singapore as it transcends beyond just the physical design of a school campus; it is about setting a new paradigm, an inspiration for a new era of learning. **Capitalizing on topography: A mid-level planning strategy:** The design creatively takes advantage of the sloping terrain using a mid-level strategy. The main entrance is located on the third storey, thereby reducing the scale of the six-storey building, making it appear only four stories from the street. Large communal facilities such as the library and canteen are tucked under one end of the track and field, freeing up valuable ground space for other facilities within a very tight site. The Concourse is the main circulation thoroughfare and it is the organizing element from which three learning clusters branch out. In line with the mid-level strategy, all science laboratories are clustered and strung along the concourse on the third storey, same level as the entrance. This creates a datum within the campus and reinforces the importance of science within the curriculum. **Transmitting knowledge: School as a three-dimensional learning tool:** The design philosophy envisions the building components of the school taking on the role of teaching tools. This concept explores the innovative use of elements abstracted from scientific and mathematical concepts, which are then integrated into the total built form. Many concepts were explored in the design of the school. Ideas include extracting the dynamic form of a double helix from the structure of DNA, and interpreting it into the form of an abstracted 'nano tube stairway' at the entry lobby. The main entrance 'Periodic Facade' was designed as an abstract version of the periodic table, with different parts of the elevation relating to different groups of elements. The "Pi Wall" defines the edge of the main concourse facing the track and field. It is derived from the mathematical concept of Pi, and consists of a mosaic of rectangular perforated aluminium panels that are translated into the decimal digits of Pi through a number-coded color system. The Eco-Learning Trail allows students to learn about natural habitats and natural processes. It meanders its way through the courtyards in-between teaching blocks, along the main concourse. The aquatic and eco systems, flora and fauna provide students with real life examples, enriching their total learning experience. **Fostering community: School as a social hub** The master plan aims to create a student-focused campus that is inter-connected and conducive for student interaction. Designed as an open campus, clear zoning between Academia, Living and Sports ensures proper passive security and safety. The school and hostel are distinct yet connected. The canteen and library are co-located to form a social arena. The landscaped courtyards of the eco-learning trail soften in-between spaces and encourage spillover activities. **Supporting learning: flexibility:** Flexibility is integrated into the design of high school in order to support learning and accommodate changing pedagogies. The Concourse is designed as an open-concept, flexible space that can accommodate a variety of uses ranging from exhibition gallery, study corners, learning pods, science fairs and mathematics Olympiads. Classroom blocks are arranged in clusters to facilitate organization by grade levels, department or multi-disciplinary. Individual classrooms are also designed to allow different layout configurations to accommodate different modes of learning.

-Information & photos courtesy of designshare.com

Case Study Focus: Program, Concept & Curriculum







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